Baton Rouge

PARKING FEASIBILITY STUDY

Final Draft

SUBMITTED TO:

Plan Baton Rouge
and
Downtown Development District

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1.0 Introduction

Background

Downtown Baton Rouge has seen a tremendous renaissance in recent years, due mostly to the direction and initiatives developed and implemented as part of the Plan Baton Rouge program and the Downtown Development District. Beginning with the planning charrette conducted in the summer of 1998, many of the developed initiatives have now been implemented, and plans to implement the balance are moving forward. As a result, Downtown Baton Rouge has seen increased development, redevelopment, and growth, concurrent with a significant increase in both business and recreational activity. With this growth, the city has recognized the need to provide adequate infrastructure to serve the demand on its municipal services and visitor amenities. This goal is the focus of the study.

Additionally, as the overall health of Downtown has improved dramatically, Baton Rouge is faced with another challenge in ensuring the economic sustainability of Downtown. The issues of parking management and provision have been and will continue to be central to any development efforts in Downtown. This report summarizes a 5-month long parking process that was undertaken to investigate, discuss and develop solutions related to parking demands.

The report is organized into the six sections:

1.0 *Introduction:* Gives a background on rationale and goals of the Parking Feasibility Study.

2.0 *Context:* Summarizes the existing land uses, parking demand and supply conditions, and parking enforcement policies around Downtown within the study area.

3.0 *Parking Demand Modeling:* Synthesizes the results of the parking demand model based on current and projected development scenarios.

4.0 *Conclusions and Preferred Site:* Summarizes the results of the analysis and presents the recommended site for a new parking structure.

5.0 *Garage Site Concepts:* Presents the parking garage layouts, capacity, and general access considerations.

6.0 *Garage Cost & Revenue Estimate:* Provides a generalized estimate of the cost for the preferred site parking structure. This section also presents the

analysis and anticipated revenue that will be produced by the new parking structure and rate considerations needed to meet garage costs.

Why Focus on Parking

To Maintain Existing Character

Today, development initiatives in Baton Rouge are guided by conventional parking requirements and not by a comprehensive parking strategy. Based on these code requirements (often geared more toward suburban development typologies than urban infill), the goals of the Plan Baton Rouge initiative (e.g. quality pedestrian environment, architectural character, streetscape) can be threatened if not balanced with character preservation strategies.

Figure 1.1 – Downtown Baton Rouge Parking Garages

Baton Rouge leaders need to understand specific parking use and patterns in order to develop parking solutions that do not unnecessarily impact on the community's character and can have a positive impact on development potential. Questions such as whether on-street parking is more suitable than off-street surface lots, whether structured parking is necessary and where this should be located, and whether the standard requirements (i.e. 4 spaces/1000sf) are reasonable for a Downtown mixed-use environment, must be explored.

To Sustain Existing Economic Activity

In order to sustain economic vitality, there should be a balance between the creation of a quality urban environment and the market reality in Downtown Baton Rouge. Parking infrastructure is one of the elements that the City must protect for the downtown area to be competitive with new developments around the region.

To Support Future Plans

Parking facilities are a necessary component for all significant future development initiatives being considered. From popular destinations such as the USS Kidd, the Louisiana Art and Science Museum (LASM), and Old State Capitol, to new development efforts such as Courthouse and the River Center expansion, to public infrastructure improvements such as the River Road improvements and the riverside park and bike path, to redevelopment initiatives spawned by other Downtown activity, appropriate parking design and provisions are critical to each initiative moving forward. Although not specifically addressed in this study, a comprehensive parking plan is needed to prepare for the planned development projects and to support the demands generated by "design" day events that occur only periodically throughout the year.

Figure 1.2 – Baton Rouge Old State Capitol

The goals of this Parking Feasibility Study are twofold; first, to enable the City to examine its parking facilities and demand and supply patterns comprehensively; and second, to develop parking recommendations that support Downtown investment and redevelopment without compromising Downtown's momentum and vision.

Study Area

The study area is bound by the Mississippi River on the west, St. Joseph Street on the east, US 190/61 on the north and South Boulevard on the south. This area is shown on ***Figure 1.3,*** an aerial map of the entire study area. For this parking analysis, the study area was divided into five sub-areas, correlated to specific initial candidate sites for a new parking structure. Each sub-area is made up of blocks that have related land uses and similar parking demand characteristics and their boundaries approximate a 1,500-ft. walking distance. This distance is generally considered the maximum walk an employee or visitor is willing to make from parking to their destination.

In general, the model "assumes" that the parking supply within each sub-area should address the parking demands generated by land uses within them. The five initial sub-areas were reduced to three after discussions with the City and stakeholders, resulting in the detailed study of sub-areas 1, 3, and 4. These initial five site locations are shown in ***Figure 1.4***. The sites that were eliminated from the study were Site 2 and Site 5.

Down-Selection

Site 2 is located on the west side of the levee adjacent to the Mississippi Rover and north of the Argosy Casino. After discussions with the City and various stakeholders, this site was eliminated from further study for the following reasons:

- Access is constrained, since there would only be a single ingress and egress point
- Access over the railroad tracks and levee may restrict usage by some patrons and would be significant in cost
- Trains would frequently create an obstacle to garage access
- The site has no major connection to primary arterials

Site 5 was eliminated from the parking study for the following reasons:

- The site is outside the limits that would to serve the highest demands within the study area
- The site location exceeds the five-minute walk distance criteria for many of the major generators
- North Boulevard is a perceived barrier to some of the attractions that would be served by this garage
- The site is under consideration for development of office uses

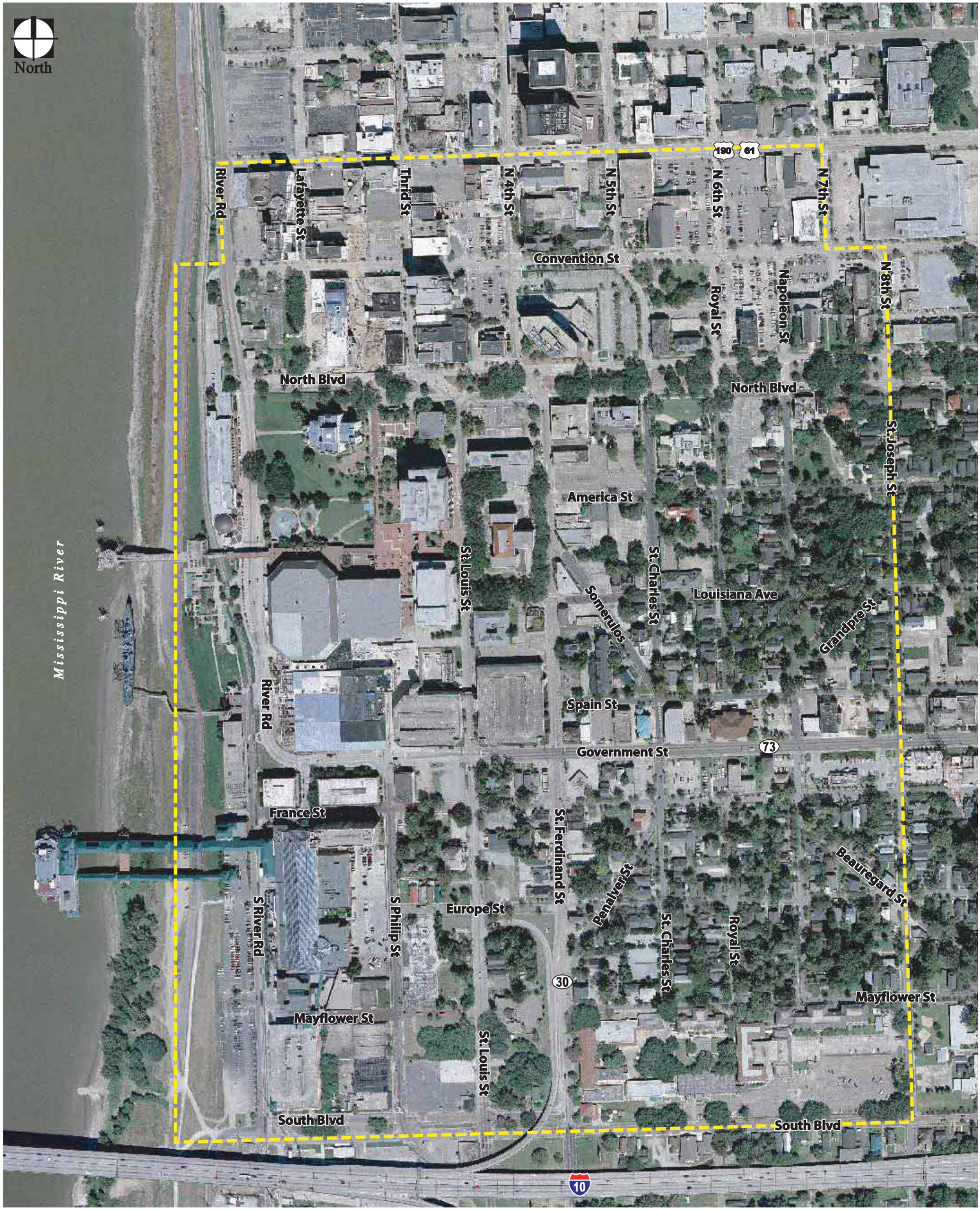


Figure 1.3
Study Area

Figure 1.4
Potential Sites

Viable Alternatives

Sub-area 1: Includes office, institutional and mixed-use uses north of South Boulevard and adjacent to Government Street on the north. This sub-area includes the Argosy and old Coca-Cola properties, as well as the City Police Headquarters. Many of the blocks in this area have been identified for potential future redevelopment.

Sub-area 3: Boundary runs along Government Street to the south and Louisiana Avenue to the north, but also includes the area north to North Boulevard from St. Louis Street to the River. Includes the River Center and its related uses, Baton Rouge Governmental Building, and the Old State Capitol Building.

Sub-area 4: Includes the balance of the area not within Sub-Area 3 north to US 190/61 Business. Incorporates the St. James Episcopal Day School, Governor's Mansion, and City Court.

The sub-areas are spatially located as illustrated in ***Figure 1.5***. The potential garage sites are also shown. The block numbers used in this report were developed for use in this project and do not have any relationship to any existing block number assignments.

Figure 1.5
Sub-Area Boundaries

2.0 Context

Existing Land Use

The total study area in Downtown Baton Rouge contains approximately 2.3 million square feet of built space, comprised of retail, private and government office, institutional, and residential uses. Private office is the largest single use in the area accounting for approximately 986,000 square feet, or 43% of the gross floor area.

Table 2.1 – Downtown Baton Rouge Land Distribution in Study Area

Land Use	Existing Area	% of Total
Private Offices	985,763	43%
Government Office	499,741	22%
Church	311,000	13%
Residential	228,638	10%
Museum	68,000	2.9%
School/Child Development	57,801	2.5%
Casino	57,000	2.5%
Restaurant	30,700	1.3%
Retail	3,352	0.1%
Others	65,494	2.8%
Total	**2,307,489**	**100%**

Source: Downtown Development District

Retail uses, historically perceived to be a dominant land use in the Downtown, only occupy around 3,400 square feet, about 0.1% of the total built area. ***Table 2.1*** summarizes the land use distribution in the study area.

Existing Parking Supply

A comprehensive field survey was conducted to obtain specific counts and location of all parking (public and private) located within each sub-area. Surface lot, parking garages, on-street, and individual parcel parking were identified.

Parking supply in Downtown is grouped into three general categories: On-street Parking; Surface Lot Parking; and Structure Parking. Surface lots account for 65% of the parking supply while structured parking contributes around 22% of overall parking. Of the 4,216 off-street parking spaces, 84% are considered private and only 16% is accessible to the public. This breakdown may been seen on ***Table 2.2***.

On-street parking spaces make up about 13% of the total parking within the study area.

Table 2.2 – Downtown Baton Rouge Parking Supply in Study Area

Parking Type	Spaces
On-Street	*837*
Surface Lots	*4,216*
Public Lots*	685
Private Lots	3,531
Structured Parking	*1,407*
Total	**6,460**

* Parking is considered public if spaces are accessible by public without prior arrangement (i.e. monthly rentals, lease agreement, etc.). Public parking can be free or paid.

Source: Downtown Development District

The current parking ratio in Downtown Baton Rouge is about 2.80 spaces per 1,000 square feet of built space. This ratio is considerably lower than most suburban exclusive-use scenarios and more typical for urban mixed-use environments. Typical suburban parking ratios are as high as 5.5 to 6 spaces per 1,000 square feet. Urban parking ratios are lower because the parking supply is shared among different uses with different peak periods of parking consumption. When compared to industry-accepted parking generation rates and code requirements, the actual demand rates recorded during the surveys for the major land uses in Downtown during peak periods were much lower.

Table 2.3 compares the parking numbers generated based on the following methods: Institute of Transportation Engineers (ITE) rates; Baton Rouge code requirements; and actual observed parking use in Downtown (shared parking model).

This comparison would indicate that during an average day, the parking supply in the study area is more than adequate to serve the overall demand. However, observations made during the parking survey did indicate some areas where space availability was constrained.

A parking survey was conducted for one weekday and one weekend day over the 58-block study area to determine the utilization of the existing parking supply within the study area. The number of parking spaces and occupancy was recorded for both public and private

Table 2.3 – Comparison of Parking Generation Methods

Land Use	Existing Floor Area (units)	ITE Parking Generation	Baton Rouge Code	Baton Rouge Shared Parking Model
Private Offices	985,763	2,130	3,954	1,347
Residential	228,638 (59)	59	112	86
Retail	3,352	4	11	9
Government Office	499,741	1,920	1,999	1,117
Restaurant	30,700	294	614	640
Total		**4,407**	**6,690**	**3,199**

Source: Downtown Development District

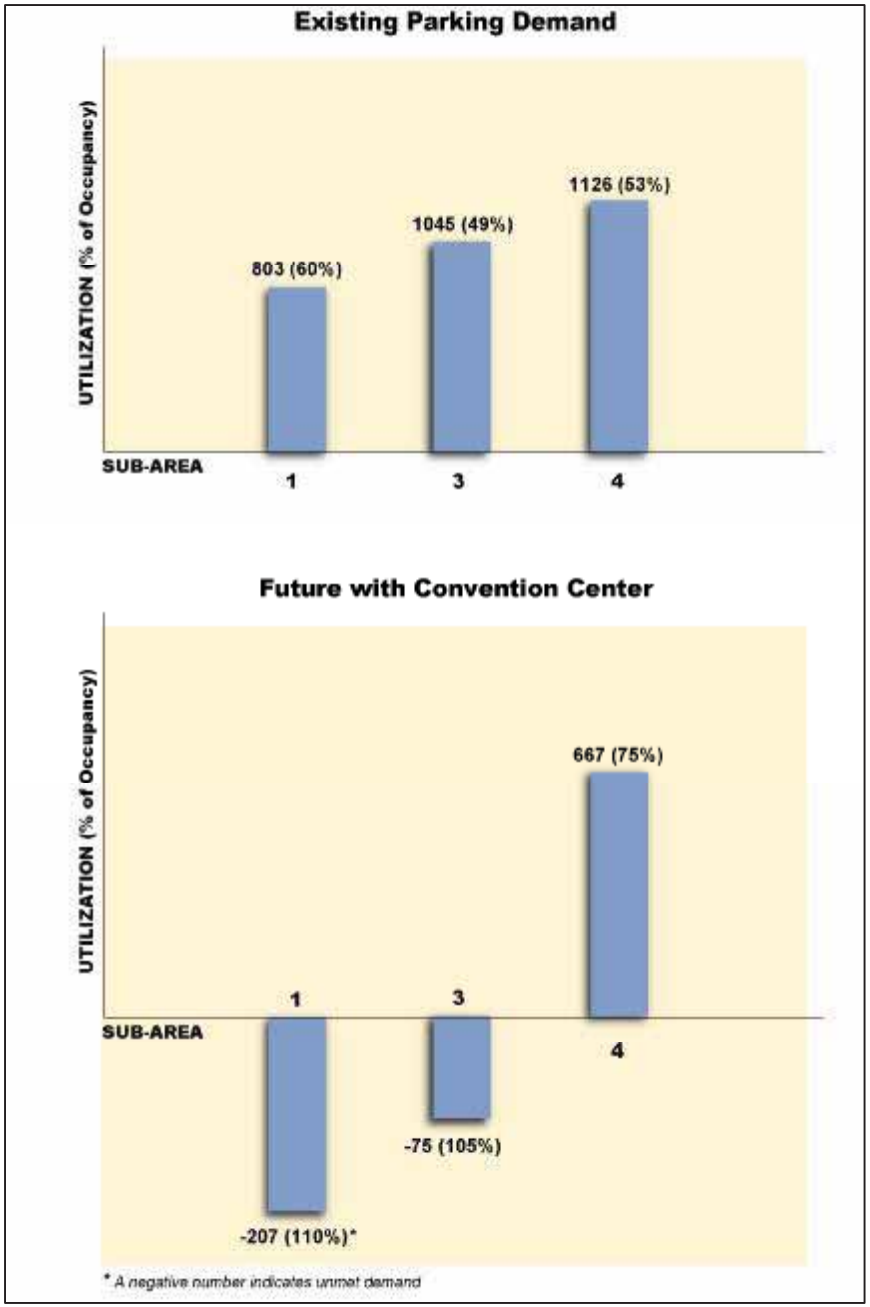


Figure 2.1 – Utilization by Sub-Area

parking facilities, as well as for both on-street and off-street parking. In addition, the ingress/egress records of the existing parking decks were obtained and analyzed to determine occupancy of the decks by hour on both a weekday and weekend day. Utilization profiles for each sub-area are shown in ***Figure 2.1***. A chart of the in/out records is shown in ***Figures 2.2*** and ***2.3***.

This data was used to establish a baseline supply and utilization profile for each sub-area, and to determine the existing surplus or shortfall in number of parking spaces. This profile, along with the projected growth in the Downtown area, was used in the development (calibration) of the parking model to determine future parking needs within the study area.

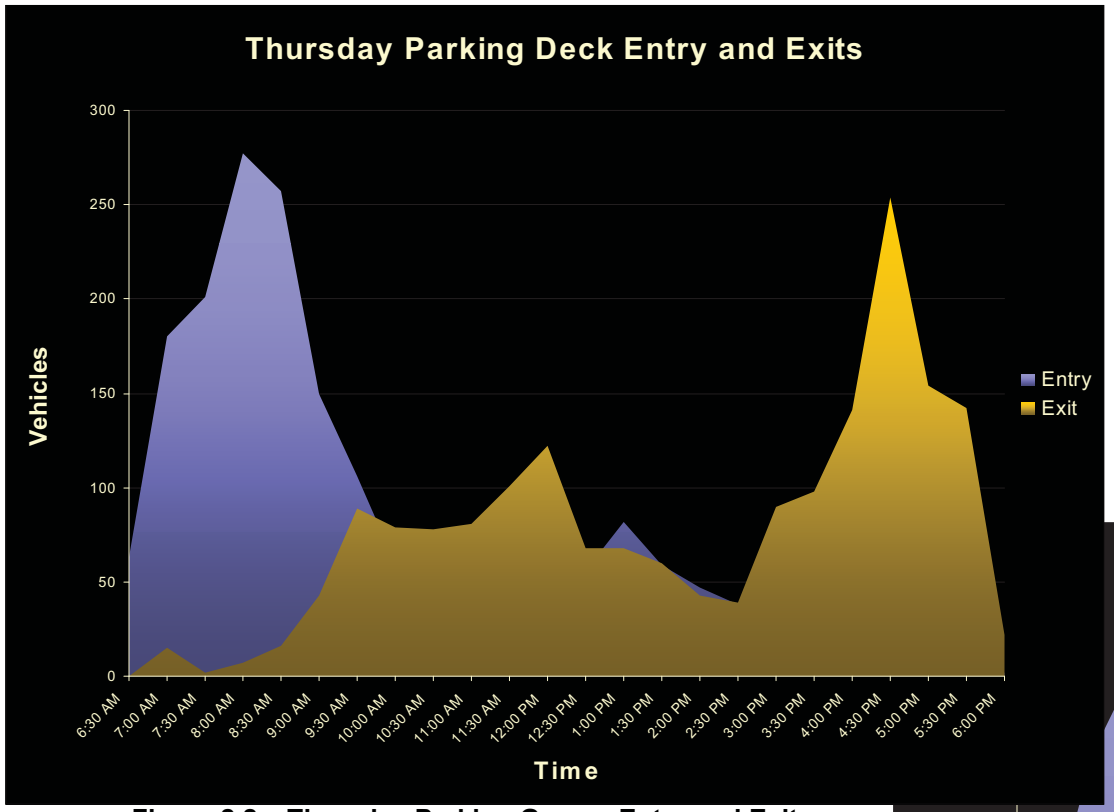


Figure 2.2 – Thursday Parking Garage Entry and Exits

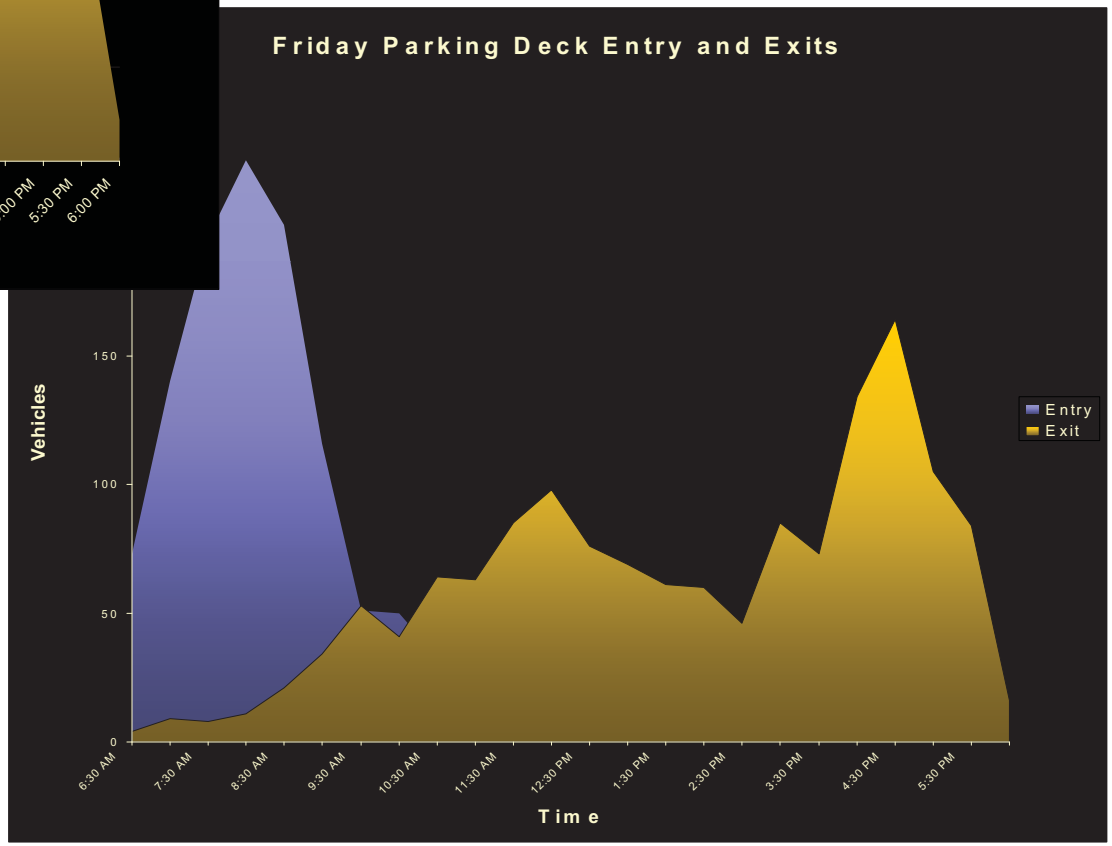


Figure 2.3 – Friday Parking Garage Entry and Exits

3.0 Parking Demand Modeling

Rationale for a Parking Model

The parking demand model was developed specific to the study area to link observed parking use from surveys with "standard" land used-based parking generation rates published by the ITE. These ITE rates were determined for restaurant, retail, and office land uses, and were used to establish the parking demand for each land use. The demand and occupancy were then normalized to determine a shared use parking percentage between land uses. The parking demand model used for future analysis adjusted ITE demand rates by the observed shared use reduction rate (in this case, 14%) to estimate future parking demand of the downtown area. This shared use rate is to account for parking spaces used for a variety of uses in one trip, such as work and dining. ***Figure 3.1*** graphically demonstrates why the shared use reduction rate is appropriate for a downtown environment.

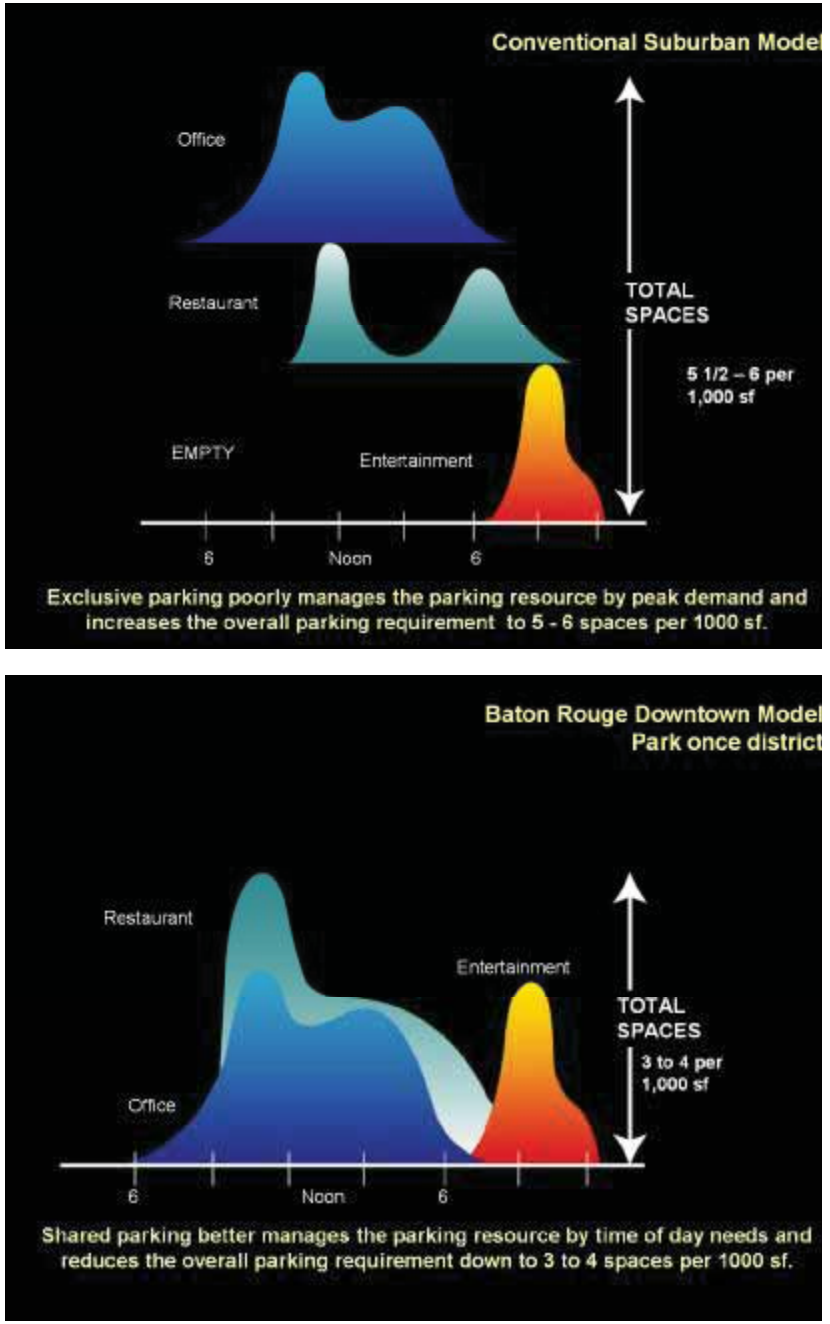
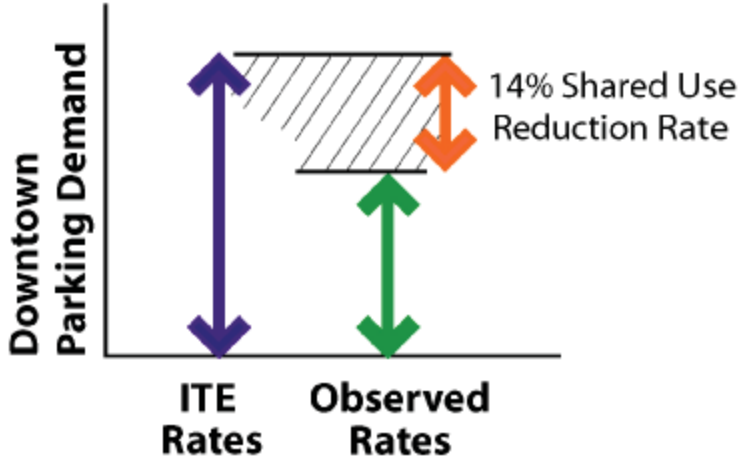


Figure 3.1 – Suburban and Urban Parking Use

Figure 3.2 illustrates how the parking demand model is generated. When projecting parking demand is based on a future scenario:

- The standard ITE rates are applied to estimate "standard demand" of each of the land uses
- The preliminary demand figure is reduced by the "shared use" reduction rate
- The final demand figure is compared to available parking supply to estimate the surplus or deficit of parking

The parking demand model's estimates of surplus and deficits were then stratified into seven second-tier sub-areas within the study area.



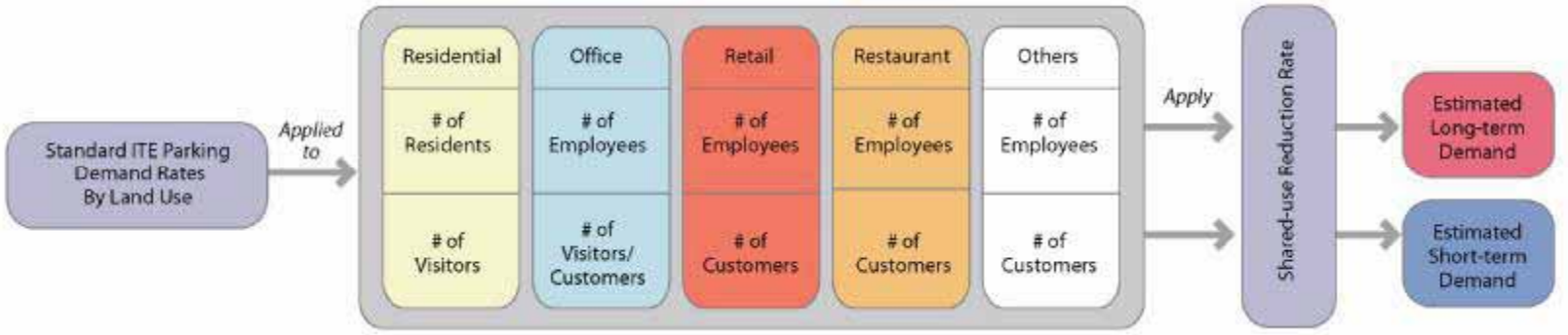


Figure 3.2 – Parking Demand Model

Parking Types by Time Duration

The model evaluated parking needs based on how long users would occupy a parking space. Aside from being able to estimate the magnitude of parking need in a certain sub-area, the demand model can also qualify the type of parking needed. Parking by duration is grouped according to *Short-term* and *Long-term Parking*.

Short-term parking is typically dedicated to customers and visitors. These spaces are time-restricted, and are usually publicly owned. For this study, all on-street parking spaces are considered short-term since these are functionally intended for visitors and customers.

Long-term parking is parking allotted to employees and residents. These spaces have no time- limit and can be paid or free. Long-term spaces are assumed to be in a garage or on a surface lot.

Parking Demand Data Collection

Data collection to determine the existing parking demand and occupancy rates within the study area were conducted over the course of two days, Friday, June 4 and Saturday, June 5, 2004. A total of 62 blocks were included in the data collection in the area bounded by Florida Street on the north, South Boulevard to the south, the levee on the west, and St. Joseph Street on the east. The numbers of occupied parking spaces were counted on for each of the blocks in 30-minute intervals throughout the day. On Friday, June 4, the data collection started at 7:00am and continued to 7:00pm. On Saturday, June 5, the data collection began 9:00am and continued to 9:00pm. The counts were categorized into on-street versus off-street parking, as well as public versus private parking. A total of 5,053 spaces were inventoried on each of the two days. This total does not include the supply of parking at any of the parking garages within the study area. The raw data was then entered into the parking model to calculate the overall demand and occupancy rate.

Model Results

The parking model estimates for existing and future conditions with and without the convention center were produced to provide a basis for the site selection and to verify demand to capacity rations. ***Tables 3.1*** through ***3.3*** show a detailed summary of each model scenario.

Existing Condition

Based on the existing land use data provided to the study team by the Downtown Development District and Plan Baton Rouge, and occupancy rates recorded during the two days of field survey, the observed parking demand was recorded and is summarized in ***Figure 3.3***. Currently Sub-area 1 has the highest occupancy of the three study areas, with an overall occupancy rate of 60% during the peak-weekend period. The data show that all three sub-areas have some amount of surplus in the long-term parking for the existing case.

Note that the model does not treat the sub-areas as hard boundaries but accounts for the transference of demand throughout the entire study area. This is accomplished by normalizing the model using a ratio of the estimated parking demand to the observed parking demand. The ITE rates used to estimate the parking demand do not take into account the shared use rate that occurs in downtown parking conditions. Therefore, this estimate must be normalized to the observed occupancy by developing a shared use adjustment rate that creates a ratio of 1.00 for the entire study area. The ratio of existing conditions is then used in the future models to accurately predict the demand of each block regardless of its associated sub-area.

Figures 3.4 through ***3.6*** display each site's area of influence as an intensity gradient, similar to a gravity model, with the darkest shading representing the areas of greatest demand to its respective site. Though this demand crosses sub-area boundaries, it is accounted for in the model due to the normalization factor.

Future Scenario

Various private and public development projects were in different stages of development or construction stages during the duration of the parking study and therefore their effect on parking demand was not reflected in the base (existing) case study. The study does allow for the impact of these development projects to ensure that the downtown area (and the city) is prepared for any parking demands these developments will require over the next 20 years.

TABLE - 3.1
EXISTING CONDITIONS BASE MODEL
BATON ROUGE PARKING GARAGE STUDY

		Office		Retail	Restaurant	Other		Estimated Peak Hour Parking Demand			Parking Supply			Observed	Surplus	Ratio
	Residents	Private	Government	Employees	Employees	Employees	Total	Short Term	Long Term	Total	Short Term	Long Term	Total	Occupancy	(Shortage)	to Count
Sub-Area 4	**28**	**1053**	**736**	**4**	**58**	**308**	**2187**	**439**	**1118**	**1557**	**386**	**2018**	**2404**	**1278**	**1126**	**1.22**
Block 1	0	0	0	0	0	0	0	0	0	0	18	64	82	50	32	0.00
Block 2	0	240	0	0	0	5	245	19	152	171	17	156	173	118	55	1.45
Block 3	9	49	0	0	32	9	99	160	52	213	16	161	177	120	57	1.77
Block 4	0	4	0	0	0	58	62	1	5	6	16	23	39	18	21	0.33
Block 4a	0	0	0	0	0	71	71	1	3	4	11	122	133	52	81	0.07
Block 4b	0	36	0	0	0	0	36	3	23	26	8	163	171	56	115	0.46
Block 5	0	361	0	0	0	0	361	28	229	257	17	200	217	148	69	1.74
Block 5a	0	37	0	0	0	18	55	3	24	27	21	82	103	53	50	0.52
Block 5b	0	60	0	0	0	0	60	5	38	43	8	136	144	42	102	1.02
Block 5c	0	0	0	0	0	76	76	1	3	4	24	58	82	52	30	0.08
Block 6	1	40	300	4	7	32	383	68	192	260	15	76	91	87	4	2.99
Block 7	0	3	0	0	20	0	23	96	13	108	12	0	12	5	7	21.70
Block 8	0	0	0	0	0	0	0	0	0	0	12	0	12	9	3	0.00
Block 10	0	0	205	0	0	0	205	16	109	125	56	109	165	124	41	1.01
Block 11	0	0	231	0	0	20	251	19	124	142	23	159	182	61	121	2.33
Block 11a	2	6	0	0	0	18	27	1	5	6	10	16	26	18	8	0.35
Block 11b	0	13	0	0	0	0	13	1	8	9	14	156	170	82	88	0.11
Block 11c	3	58	0	0	0	0	61	5	38	43	16	13	29	28	1	1.53
Block 12	1	98	0	0	0	0	99	8	63	70	6	148	154	54	100	1.30
Block 12a	0	22	0	0	0	0	22	2	14	16	16	108	124	45	79	0.35
Block 12b	7	10	0	0	0	0	17	1	9	11	25	23	48	18	30	0.60
Block 12c	5	16	0	0	0	0	21	2	12	14	25	45	70	8	62	1.73
Block 16a	0	0	0	0	0	0	0	0	0	0	0	0	0	30	***-30***	0.00
Sub-Area 3	**16**	**211**	**1255**	**0**	**16**	**245**	**1743**	**198**	**827**	**1024**	**127**	**1923**	**2050**	**1005**	**1045**	**1.02**
Block 9a	0	0	1200	0	0	61	1261	96	640	736	10	68	78	44	34	16.73
Block 9b	0	0	0	0	0	28	28	0	1	1	0	536	536	265	271	0.01
Block 13	0	10	0	0	16	0	26	79	15	94	31	71	102	67	35	1.40
Block 13a	6	42	0	0	0	0	48	4	29	33	11	49	60	32	28	1.02
Block 13b	10	7	0	0	0	0	17	1	8	10	14	28	42	25	17	0.39
Block 13c	0	40	0	0	0	0	40	3	26	29	26	61	87	17	70	1.69
Block 14	0	21	0	0	0	15	36	2	14	16	3	46	49	20	29	0.78
Block 14a	0	10	0	0	0	60	70	1	9	11	0	56	56	19	37	0.56
Block 14b	0	41	0	0	0	0	41	3	26	29	6	54	60	3	57	9.67
Block 15	0	40	55	0	0	0	95	8	55	62	13	954	967	466	501	0.13
Block 16b	0	0	0	0	0	81	81	1	4	4	13	0	13	47	***-34***	0.09
Sub-Area 1	**16**	**790**	**0**	**0**	**54**	**924**	**1784**	**336**	**578**	**915**	**324**	**1682**	**2006**	**1203**	**803**	**0.76**
Block 17	0	155	0	0	0	12	167	12	99	111	16	7	23	8	15	13.91
Block 18	0	100	0	0	0	0	100	8	64	71	0	0	0	0	0	0.00
Block 19	0	0	0	0	0	0	0	0	0	0	6	56	62	40	22	0.00
Block 20	0	10	0	0	0	9	19	1	7	8	4	18	22	6	16	1.32
Block 21	0	0	0	0	9	0	9	43	5	48	6	59	65	37	28	1.28
Block 21a	0	0	0	0	0	0	0	0	0	0	15	76	91	12	79	0.00
Block 21b	0	0	0	0	0	0	0	0	0	0	10	39	49	25	24	0.00
Block 22	0	42	0	0	0	0	42	3	26	30	3	46	49	20	29	1.49
Block 22a	0	23	0	0	0	3	26	2	15	17	16	29	45	47	***-2***	0.35
Block 22b	0	10	0	0	0	0	10	1	7	7	27	0	27	16	11	0.46
Block 22c	0	5	0	0	45	0	50	223	28	251	39	0	39	18	21	13.92
Block 23	16	31	0	0	0	0	47	4	26	30	5	62	67	38	29	0.79
Block 24	0	0	0	0	0	0	0	0	0	0	8	43	51	65	***-14***	0.00
Block 25	0	0	0	0	0	450	450	4	20	24	10	155	165	82	83	0.29
Block 26a	0	0	0	0	0	450	450	4	20	24	0	97	97	129	***-32***	0.18
Block 26b	0	0	0	0	0	0	0	0	0	0	0	153	153	147	6	0.00
Block 27	0	0	0	0	0	0	0	0	0	0	3	0	3	8	***-5***	0.00
Block 28	0	0	0	0	0	0	0	0	0	0	10	0	10	8	2	0.00
Block 29	0	0	0	0	0	0	0	0	0	0	5	137	142	4	138	0.00
Block 30	0	0	0	0	0	0	0	0	0	0	0	60	60	28	32	0.00
Block 31	0	64	0	0	0	0	64	5	41	46	11	90	101	38	63	1.20
Block 31a	0	3	0	0	0	0	3	0	2	2	27	2	29	18	11	0.11
Block 31b	0	10	0	0	0	0	10	1	7	7	38	4	42	25	17	0.30
Block 31c	0	1	0	0	0	0	1	0	1	1	33	10	43	18	25	0.04
Block 32	0	335	0	0	0	0	335	26	213	239	32	539	571	366	205	0.65
Total	**60**	**2054**	**1991**	**4**	**128**	**1476**	**5714**	**972**	**2523**	**3495**	**837**	**5623**	**6460**	**3486**	**2974**	**1.00**
														54%		

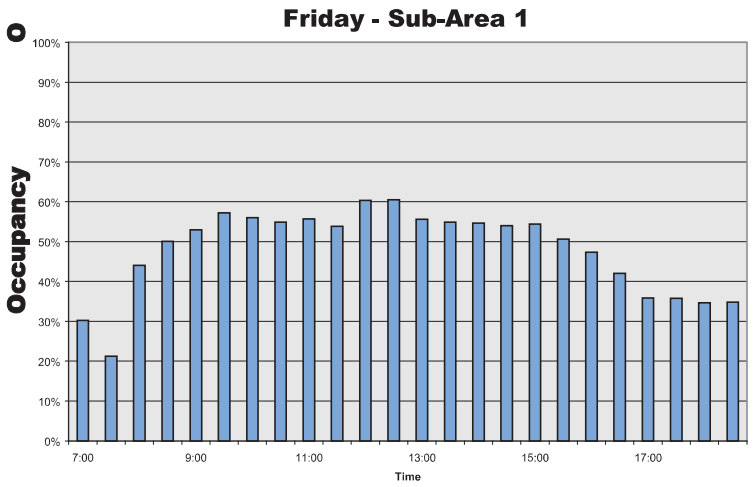
TABLE - 3.2
FUTURE MODEL WITHOUT CONVENTION CENTER
BATON ROUGE PARKING GARAGE STUDY

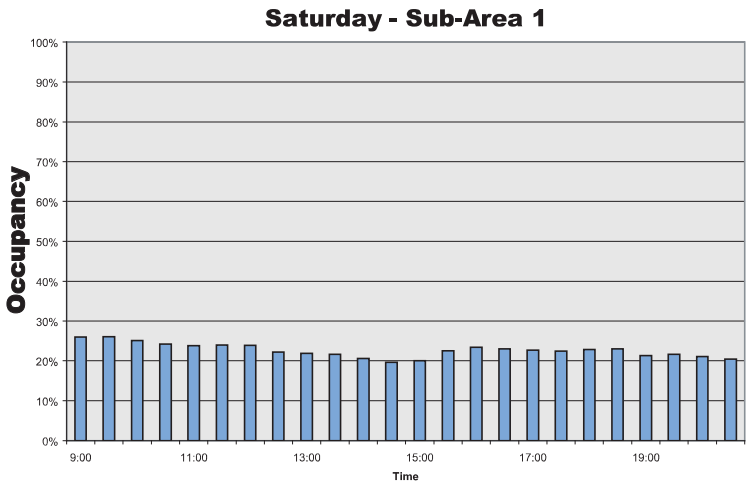
		Office		Retail	Restaurant	Other		Estimated Peak Hour Parking Demand			Parking Supply			Surplus	Estimated
	Residents	Private	Government	Employees	Employees	Employees	Total	Short Term	Long Term	Total	Short Term	Long Term	Total	(Shortage)	Occupancy
Sub-Area 4	**28**	**1053**	**736**	**39**	**58**	**980**	**2894**	**512**	**1165**	**1677**	**386**	**2318**	**2704**	**1027**	**62%**
Block 1	0	0	0	6	0	451	457	16	23	38	18	364	382	344	10%
Block 2	0	240	0	0	0	5	245	19	152	171	17	156	173	2	99%
Block 3	9	49	0	0	32	9	99	160	52	213	16	161	177	***-36***	120%
Block 4	0	4	0	0	0	58	62	1	5	6	16	23	39	33	15%
Block 4a	0	0	0	0	0	188	188	2	8	10	11	122	133	123	7%
Block 4b	0	36	0	0	0	0	36	3	23	26	8	163	171	145	15%
Block 5	0	361	0	0	0	0	361	28	229	257	17	200	217	***-40***	119%
Block 5a	0	37	0	0	0	18	55	3	24	27	21	82	103	76	27%
Block 5b	0	60	0	0	0	0	60	5	38	43	8	136	144	101	30%
Block 5c	0	0	0	0	0	85	85	1	4	4	24	58	82	78	5%
Block 6	1	40	300	4	7	32	383	68	192	260	15	76	91	***-169***	286%
Block 7	0	3	0	29	20	96	147	153	31	184	12	0	12	***-172***	1531%
Block 8	0	0	0	0	0	0	0	0	0	0	12	0	12	12	0%
Block 10	0	0	205	0	0	0	205	16	109	125	56	109	165	40	76%
Block 11	0	0	231	0	0	20	251	19	124	142	23	159	182	40	78%
Block 11a	2	6	0	0	0	18	27	1	5	6	10	16	26	20	24%
Block 11b	0	13	0	0	0	0	13	1	8	9	14	156	170	161	5%
Block 11c	3	58	0	0	0	0	61	5	38	43	16	13	29	***-14***	148%
Block 12	1	98	0	0	0	0	99	8	63	70	6	148	154	84	46%
Block 12a	0	22	0	0	0	0	22	2	14	16	16	108	124	108	13%
Block 12b	7	10	0	0	0	0	17	1	9	11	25	23	48	37	23%
Block 12c	5	16	0	0	0	0	21	2	12	14	25	45	70	56	20%
Block 16a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n/a
Sub-Area 3	**16**	**211**	**1255**	**0**	**16**	**410**	**1908**	**199**	**834**	**1033**	**127**	**1401**	**1528**	**495**	**68%**
Block 9a	0	0	1200	0	0	61	1261	96	640	736	10	68	78	***-658***	943%
Block 9b	0	0	0	0	0	193	193	2	8	10	0	14	14	4	72%
Block 13	0	10	0	0	16	0	26	79	15	94	31	71	102	8	92%
Block 13a	6	42	0	0	0	0	48	4	29	33	11	49	60	27	54%
Block 13b	10	7	0	0	0	0	17	1	8	10	14	28	42	32	23%
Block 13c	0	40	0	0	0	0	40	3	26	29	26	61	87	58	33%
Block 14	0	21	0	0	0	15	36	2	14	16	3	46	49	33	32%
Block 14a	0	10	0	0	0	60	70	1	9	11	0	56	56	45	19%
Block 14b	0	41	0	0	0	0	41	3	26	29	6	54	60	31	48%
Block 15	0	40	55	0	0	0	95	8	55	62	13	954	967	905	6%
Block 16b	0	0	0	0	0	81	81	1	4	4	13	0	13	9	33%
Sub-Area 1	**16**	**790**	**0**	**0**	**111**	**926**	**1843**	**614**	**609**	**1223**	**324**	**1682**	**2006**	**783**	**61%**
Block 17	0	155	0	0	0	12	167	12	99	111	16	7	23	***-88***	484%
Block 18	0	100	0	0	0	0	100	8	64	71	0	0	0	***-71***	n/a
Block 19	0	0	0	0	0	0	0	0	0	0	6	56	62	62	0%
Block 20	0	10	0	0	0	9	19	1	7	8	4	18	22	14	36%
Block 21	0	0	0	0	9	0	9	43	5	48	6	59	65	17	73%
Block 21a	0	0	0	0	0	0	0	0	0	0	15	76	91	91	0%
Block 21b	0	0	0	0	0	0	0	0	0	0	10	39	49	49	0%
Block 22	0	42	0	0	0	0	42	3	26	30	3	46	49	19	61%
Block 22a	0	23	0	0	0	3	26	2	15	17	16	29	45	28	37%
Block 22b	0	10	0	0	0	0	10	1	7	7	27	0	27	20	28%
Block 22c	0	5	0	0	45	0	50	223	28	251	39	0	39	***-212***	642%
Block 23	16	31	0	0	0	0	47	4	26	30	5	62	67	37	45%
Block 24	0	0	0	0	0	0	0	0	0	0	8	43	51	51	0%
Block 25	0	0	0	0	57	452	509	282	51	332	10	155	165	***-167***	201%
Block 26a	0	0	0	0	0	450	450	4	20	24	0	97	97	73	24%
Block 26b	0	0	0	0	0	0	0	0	0	0	0	153	153	153	0%
Block 27	0	0	0	0	0	0	0	0	0	0	3	0	3	3	0%
Block 28	0	0	0	0	0	0	0	0	0	0	10	0	10	10	0%
Block 29	0	0	0	0	0	0	0	0	0	0	5	137	142	142	0%
Block 30	0	0	0	0	0	0	0	0	0	0	0	60	60	60	0%
Block 31	0	64	0	0	0	0	64	5	41	46	11	90	101	55	45%
Block 31a	0	3	0	0	0	0	3	0	2	2	27	2	29	27	7%
Block 31b	0	10	0	0	0	0	10	1	7	7	38	4	42	35	18%
Block 31c	0	1	0	0	0	0	1	0	1	1	33	10	43	42	2%
Block 32	0	335	0	0	0	0	335	26	213	239	32	539	571	332	42%
Total	**60**	**2054**	**1991**	**39**	**185**	**2316**	**6645**	**1325**	**2607**	**3933**	**837**	**5401**	**6238**	**2305**	**63%**

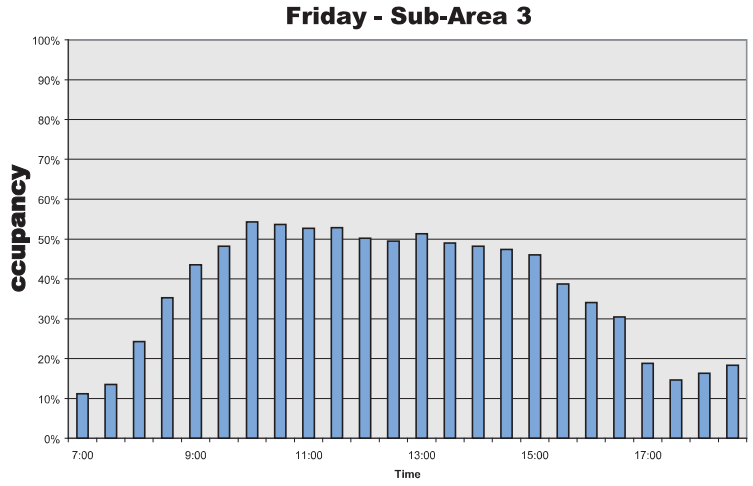
TABLE - 3.3
TOTAL FUTURE PARKING DEMAND WITH CONVENTION CENTER
BATON ROUGE PARKING GARAGE STUDY

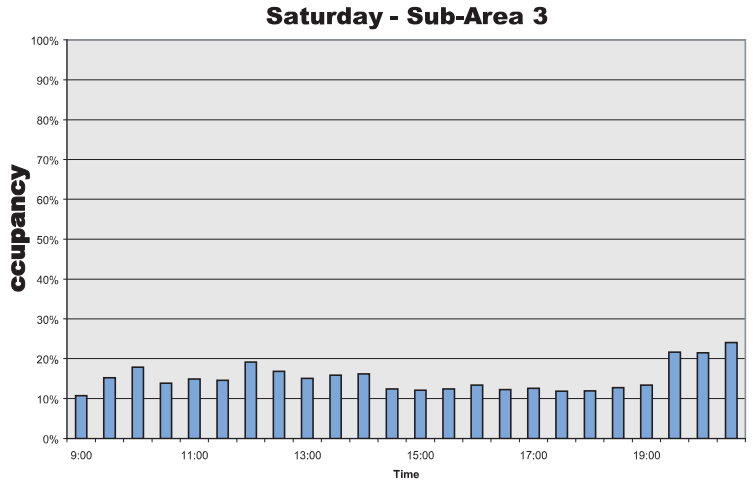
	Estimated Peak Hour Parking Demand			Parking Supply			Surplus	Estimated
	Short Term	Long Term	Total	Short Term	Long Term	Total	(Shortage)	Occupancy
Sub-Area 4	**512**	**1525**	**2037**	**386**	**2318**	**2704**	**667**	**75%**
Block 1	16	23	38	18	364	382	344	10%
Block 2	19	152	171	17	156	173	2	99%
Block 3	160	52	213	16	161	177	***-36***	120%
Block 4	1	5	6	16	23	39	33	15%
Block 4a	2	8	10	11	122	133	123	7%
Block 4b	3	23	26	8	163	171	145	15%
Block 5	28	229	257	17	200	217	***-40***	119%
Block 5a	3	24	27	21	82	103	76	27%
Block 5b	5	38	43	8	136	144	101	30%
Block 5c	1	4	4	24	58	82	78	5%
Block 6	68	192	260	15	76	91	***-169***	286%
Block 7	153	31	184	12	0	12	***-172***	1531%
Block 8	0	0	0	12	0	12	12	0%
Block 10	16	259	275	56	109	165	***-110***	167%
Block 11	19	184	202	23	159	182	***-20***	111%
Block 11a	1	5	6	10	16	26	20	24%
Block 11b	1	8	9	14	156	170	161	5%
Block 11c	5	38	43	16	13	29	***-14***	148%
Block 12	8	213	220	6	148	154	***-66***	143%
Block 12a	2	14	16	16	108	124	108	13%
Block 12b	1	9	11	25	23	48	37	23%
Block 12c	2	12	14	25	45	70	56	20%
Block 16a	0	0	0	0	0	0	0	n/a
Sub-Area 3	**199**	**1404**	**1603**	**127**	**1401**	**1528**	***-75***	**105%**
Block 9a	96	700	796	10	68	78	***-718***	1020%
Block 9b	2	8	10	0	14	14	4	72%
Block 13	79	165	244	31	71	102	***-142***	239%
Block 13a	4	29	33	11	49	60	27	54%
Block 13b	1	8	10	14	28	42	32	23%
Block 13c	3	26	29	26	61	87	58	33%
Block 14	2	164	166	3	46	49	***-117***	338%
Block 14a	1	9	11	0	56	56	45	19%
Block 14b	3	26	29	6	54	60	31	48%
Block 15	8	205	212	13	954	967	755	22%
Block 16b	1	64	64	13	0	13	***-51***	494%
Sub-Area 1	**614**	**1599**	**2213**	**324**	**1682**	**2006**	***-207***	**110%**
Block 17	12	159	171	16	7	23	***-148***	745%
Block 18	8	214	221	0	0	0	***-221***	n/a
Block 19	0	150	150	6	56	62	***-88***	242%
Block 20	1	157	158	4	18	22	***-136***	718%
Block 21	43	65	108	6	59	65	***-43***	165%
Block 21a	0	0	0	15	76	91	91	0%
Block 21b	0	0	0	10	39	49	49	0%
Block 22	3	86	90	3	46	49	***-41***	183%
Block 22a	2	15	17	16	29	45	28	37%
Block 22b	1	7	7	27	0	27	20	28%
Block 22c	223	28	251	39	0	39	***-212***	642%
Block 23	4	62	66	5	62	67	1	99%
Block 24	0	36	36	8	43	51	15	71%
Block 25	282	87	368	10	155	165	***-203***	223%
Block 26a	4	56	60	0	97	97	37	61%
Block 26b	0	36	36	0	153	153	117	24%
Block 27	0	36	36	3	0	3	***-33***	1200%
Block 28	0	36	36	10	0	10	***-26***	360%
Block 29	0	36	36	5	137	142	106	25%
Block 30	0	36	36	0	60	60	24	60%
Block 31	5	77	82	11	90	101	19	81%
Block 31a	0	2	2	27	2	29	27	7%
Block 31b	1	7	7	38	4	42	35	18%
Block 31c	0	1	1	33	10	43	42	2%
Block 32	26	213	239	32	539	571	332	42%
Total	**1325**	**4527**	**5853**	**837**	**5401**	**6238**	**385**	**94%**
Total (ConvCtr Area of Influence)	**588**	**3281**	**3869**	**242**	**2538**	**2780**	**-1089**	139%

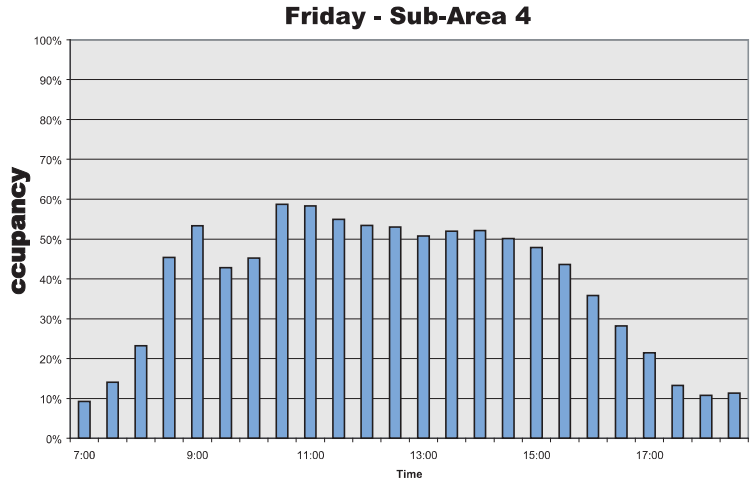
Shaded area is Convention Center area of influence











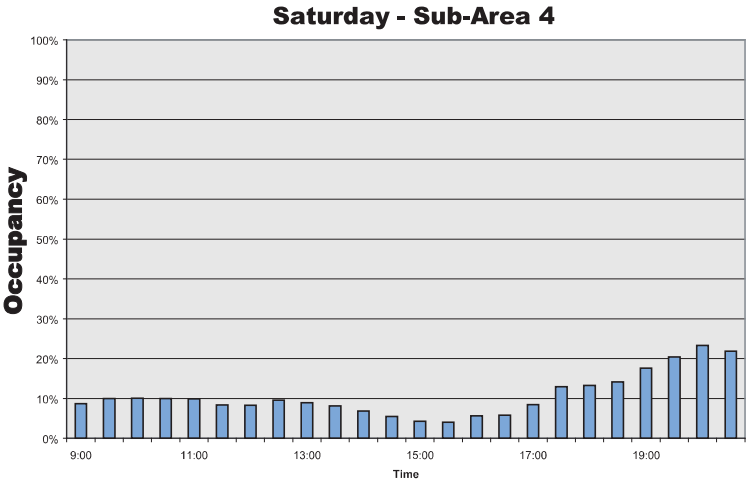
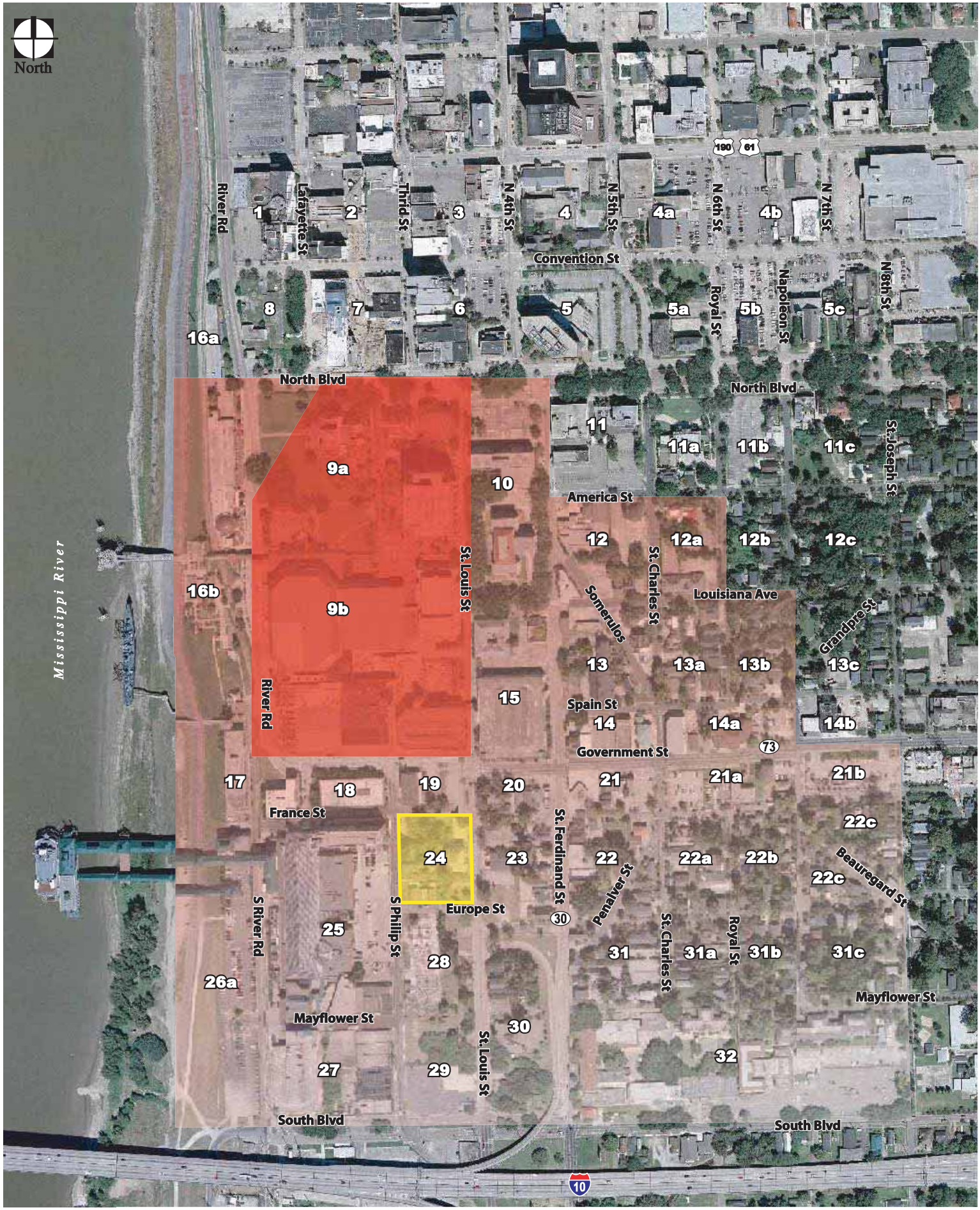


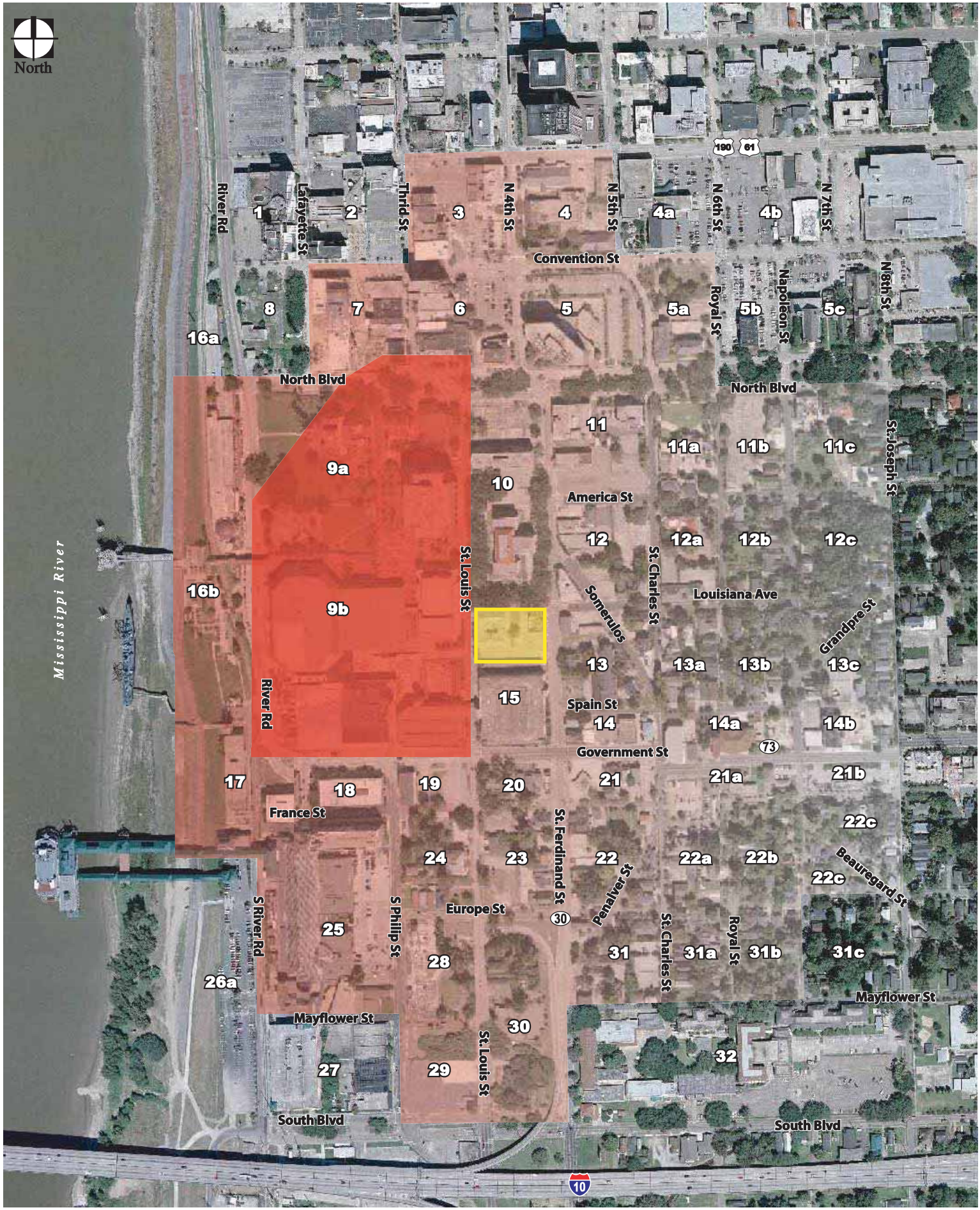
Figure 3.3
Parking Utilization



Parking Demand Density

Figure 3.4

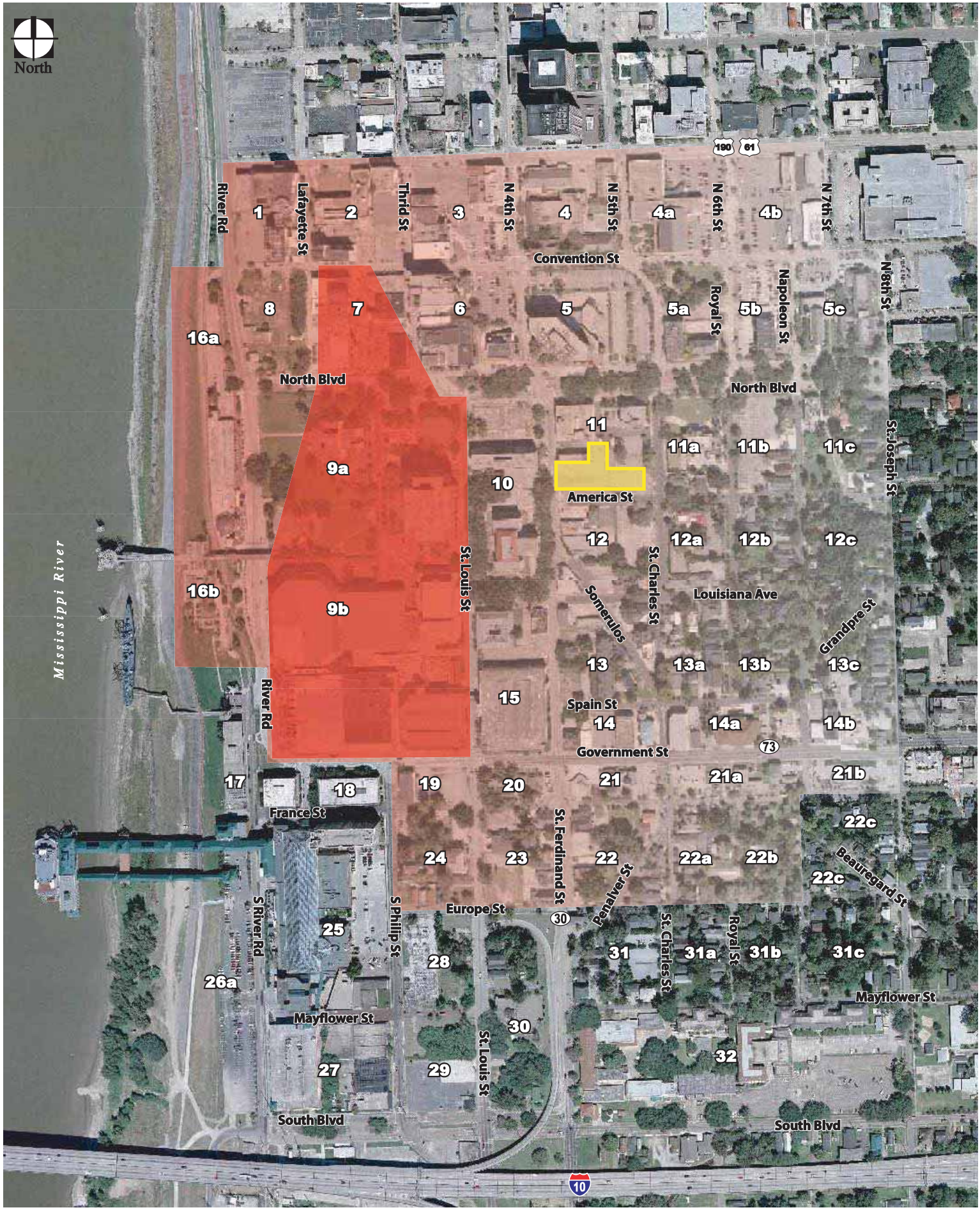
Area of Influence: Site 1



Parking Demand Density

Figure 3.5

Area of Influence: Site 3



Parking Demand Density

Figure 3.6

Area of Influence: Site 4

Figure 3.7 illustrates each of the known significant development projects that are included in the analysis.

Other assumptions used in the future modeling process were that the existing West Garage (552 spaces in block 9b) would be demolished for the Convention Center Phase 3, and the demand of that area was shifted to the garage in block 15. Also, for the purpose of this study, the proposed future courthouse was not considered in the parking demand.

Convention Traffic

The peak parking demand for the Baton Rouge River Center is based on data from a convention center of similar size and function located in Rochester, NY. The Rochester Convention Center is in a comparable sized city, located downtown along a river, and is close to a major convention center in New York City. A map of the downtown Rochester Convention Center area may be seen on Figure 3.8. Data from this comparable site was utilized due to the lack of specific program data available from the Baton Rouge River Center. The expected average attendance per event in Rochester is approximately 3,700 people per day. To determine the peak parking demand for Baton Rouge, this number was first reduced by 5% or to approximately 3,500 to approximate attendance for the peak period of the day. Then, an occupancy rate of 1.5 persons per vehicle was used based upon experience with previous similar studies and engineering judgment, creating an estimated demand of 2,300 vehicles for the peak period. To normalize this number to Baton Rouge, a ratio of square footages was used. This ratio is 125,000 S.F. to 150,000 S.F. for Baton Rouge and Rochester, respectively. Therefore, the peak parking demand used for the Baton Rouge River Center is 1,920 vehicles. These computations are shown numerically below:

$$3{,}700 * 95\% \cong 3{,}500 \qquad \frac{3{,}500}{1.5} \cong 2{,}300 \qquad \frac{125{,}000}{150{,}000} * 2{,}300 \cong 1{,}920$$

Daily attendance vs. peak-hour | Vehicle occupancy | Square-footage ratio

The future demand modeling evaluated two scenarios in study area: one including the entire study area and one with certain blocks within Sub-Area 1 removed to account for their residential nature. The great majority of additional traffic in the future model is attributable to the expanded convention center; therefore, the purpose of removing portions of Sub-Area 1 is to remove parking supply and demand that is not convenient or likely for convention guests and visitors. The blocks that have been removed for this scenario are shown in Figure 3.9.

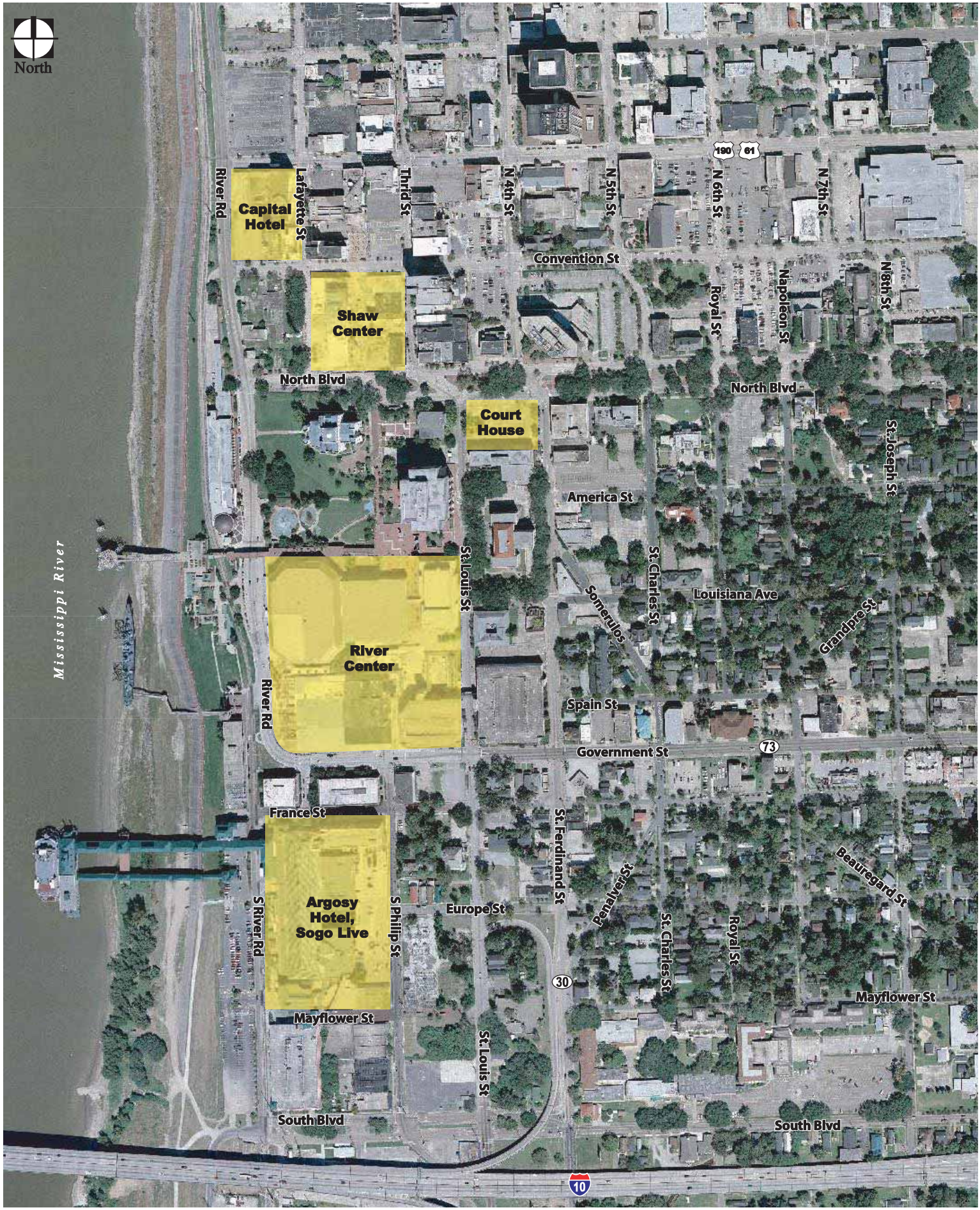


Figure 3.7
Planned Projects

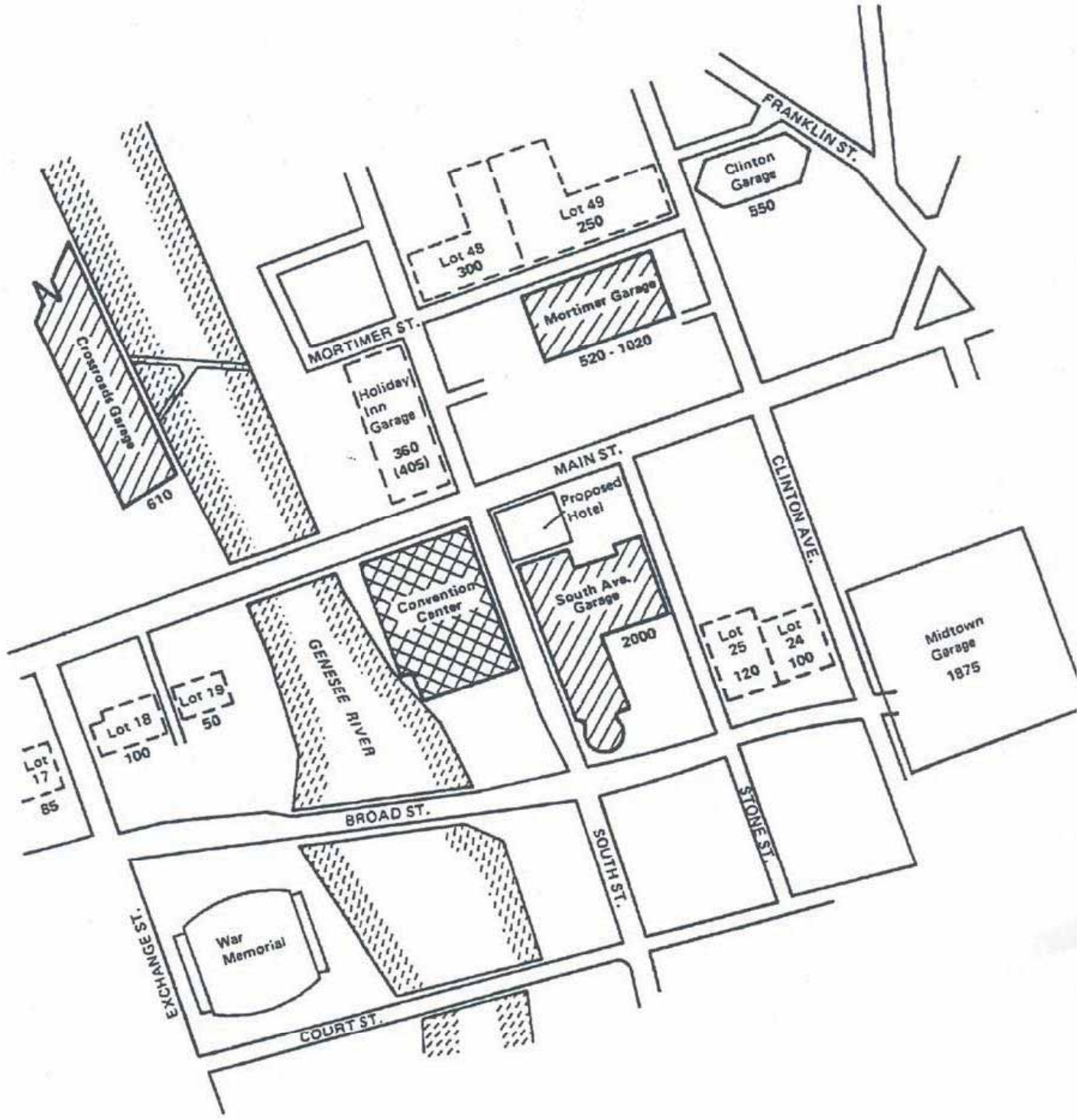


Figure 3.8
□ oc□ e□ter □ on□ention □ enter

Figure 3.9

Study Area with Block Removal

Furthermore, the existing supply and demand for the removed blocks has not changed for the future scenarios, however these blocks have been removed from the equation for determining available parking supply for the convention center.

Typically, when the parking occupancy reaches 85% or greater, drivers will behave as if the parking supply is full, with extended "search" patterns. For that reason, an estimated surplus including all demand over 85% was also evaluated.

The results of the demand estimation exercises are summarized in ***Table 3.4*** and shown fully in ***Table 3.5***. Conclusions are highlighted below:

- Based on the study criteria previously described, Sub-Area 1 has the greatest estimated shortage at 207 spaces. Sub-Area 3 estimates a shortage of 75 spaces.
- Excluding certain blocks of Sub-Area 1 to provide for convention demand without impact to the surrounding neighborhood lots results in a shortage of 823 spaces in Sub-Area 1.
- When examining the parking demand at 85% capacity, the shortage rises considerably to 929 for Sub-Area 1 and to 304 for Sub-Area 3. These numbers are best used for determining the range of parking demand that should be considered for conceptual garage design and financial analysis.

Table 3.4 - Future Parking Demand by Conditions

Entire Study Area

Sub-Area	Surplus	Occupancy %
4	*667*	*75%*
3	*-75*	*105%*
1	*-207*	*110%*
Total	**385**	**94%**

Study Area with Blocks Removed

Sub-Area	Surplus	Occupancy %
4	*667*	*75%*
3	*-75*	*105%*
1	*-823*	*217%*
Total	**-230**	**105%**

85th% with Blocks Removed

Sub-Area	Surplus	Occupancy %
4	*262*	*89%*
3	*-304*	*123%*
1	*-929*	*255%*
Total	**-971**	**123%**

To determine the amount of parking spaces needed in the new garage, only the surplus of blocks within sub-areas 1 and 3 and, of those, only the blocks in the convention center area of influence were counted. This produces an estimated demand of 1,383 spaces when the 85% occupancy factor is considered. That demand was used for the conceptual garage design and financial evaluation.

TABLE - 3.5
TOTAL FUTURE PARKING DEMAND WITH BLOCKS REMOVED
BATON ROUGE PARKING GARAGE STUDY

	Estimated Peak Hour Parking Demand			Parking Supply			Surplus	Estimated	85th Percentile Calculations		
	Short Term	Long Term	Total	Short Term	Long Term	Total	(Shortage)	Occupancy	Supply 85th perc	Surplus (Shortage)	Estimated Occupancy
Sub-Area 4	**512**	**1525**	**2037**	**386**	**2318**	**2704**	**667**	**75%**	**2298**	**262**	**89%**
Block 1	16	23	38	18	364	382	344	10%	325	286	12%
Block 2	19	152	171	17	156	173	2	99%	147	***-24***	116%
Block 3	160	52	213	16	161	177	***-36***	120%	150	***-62***	141%
Block 4	1	5	6	16	23	39	33	15%	33	27	18%
Block 4a	2	8	10	11	122	133	123	7%	113	103	9%
Block 4b	3	23	26	8	163	171	145	15%	145	120	18%
Block 5	28	229	257	17	200	217	***-40***	119%	184	***-73***	140%
Block 5a	3	24	27	21	82	103	76	27%	88	60	31%
Block 5b	5	38	43	8	136	144	101	30%	122	79	35%
Block 5c	1	4	4	24	58	82	78	5%	70	65	6%
Block 6	68	192	260	15	76	91	***-169***	286%	77	***-183***	337%
Block 7	153	31	184	12	0	12	***-172***	1531%	10	***-174***	1801%
Block 8	0	0	0	12	0	12	12	0%	10	10	0%
Block 10	16	259	275	56	109	165	***-110***	167%	140	***-135***	196%
Block 11	19	184	202	23	159	182	***-20***	111%	155	***-47***	131%
Block 11a	1	5	6	10	16	26	20	24%	22	16	28%
Block 11b	1	8	9	14	156	170	161	5%	145	135	6%
Block 11c	5	38	43	16	13	29	***-14***	148%	25	***-18***	174%
Block 12	8	213	220	6	148	154	***-66***	143%	131	***-90***	168%
Block 12a	2	14	16	16	108	124	108	13%	105	90	15%
Block 12b	1	9	11	25	23	48	37	23%	41	30	27%
Block 12c	2	12	14	25	45	70	56	20%	60	46	23%
Block 16a	0	0	0	0	0	0	0	n/a	0	0	#DIV/0!
Sub-Area 3	**199**	**1404**	**1603**	**127**	**1401**	**1528**	***-75***	**105%**	**1299**	**-304**	**123%**
Block 9a	96	700	796	10	68	78	***-718***	1020%	66	-730	1200%
Block 9b	2	8	10	0	14	14	4	72%	12	2	85%
Block 13	79	165	244	31	71	102	***-142***	239%	87	-157	281%
Block 13a	4	29	33	11	49	60	27	54%	51	18	64%
Block 13b	1	8	10	14	28	42	32	23%	36	26	28%
Block 13c	3	26	29	26	61	87	58	33%	74	45	39%
Block 14	2	164	166	3	46	49	***-117***	338%	42	-124	398%
Block 14a	1	9	11	0	56	56	45	19%	48	37	22%
Block 14b	3	26	29	6	54	60	31	48%	51	22	57%
Block 15	8	205	212	13	954	967	755	22%	822	610	26%
Block 16b	1	64	64	13	0	13	***-51***	494%	11	-53	581%
Sub-Area 1	**306**	**1223**	**1529**	**58**	**648**	**706**	***-823***	**217%**	**600**	**-929**	**255%**
Block 17	12	159	171	16	7	23	***-148***	745%	20	***-152***	876%
Block 18	8	214	221	0	0	0	***-221***	n/a	0	***-221***	#DIV/0!
Block 19	0	150	150	6	56	62	***-88***	242%	53	***-97***	285%
Block 24	0	414	414	8	43	51	***-363***	812%	43	***-371***	955%
Block 25	282	87	368	10	155	165	***-203***	223%	140	***-228***	263%
Block 26a	4	56	60	0	97	97	37	61%	82	23	72%
Block 26b	0	36	36	0	153	153	117	24%	130	94	28%
Block 27	0	36	36	3	0	3	***-33***	1200%	3	***-33***	1412%
Block 28	0	36	36	10	0	10	***-26***	360%	9	***-28***	424%
Block 29	0	36	36	5	137	142	106	25%	121	85	30%
Total	**1017**	**4151**	**5168**	**571**	**4367**	**4938**	***-230***	**105%**	**4197**	**-971**	**123%**
Total (ConvCtr Area of Influence)	**533**	**3176**	**3708**	**213**	**2203**	**2416**	**-1292**	153%	**2054**	**-1655**	181%

No. New Spaces Needed in Site 1 Garage:	1383

Shaded area is Convention Center area of influence

4.0 Conclusions and Preferred Site

Based upon the current bookings of the Baton Rouge River Center the analysis and modeling tasks reveal that long-term parking supplies are adequate for the existing needs of the study area. However, redevelopment within Downtown, and most specifically the River Center, will place added pressure on the parking supply as demand increases. For that reason, it is recommended that the City and its partners consider construction of an additional parking facility to satisfy the projected demand.

As shown in the analyses, Sub-Areas 1 and 3 demonstrate the greatest need for additional parking supply given the development of the River Center program. The following sections examine the considerations associated with each of the associated sites.

Site 1 (Sub-Area 1)

Site 1 is located on Block 24 with an alternative footprint utilizing both Blocks 24 and 19 shown in ***Figure 4.1***. The size of the footprint proposed for this site ranges from 66,000 to 125,000 square feet. Argosy owns much of the land on which the garage would be located, along with Chris Remson, a local architect who owns the former Coca-Cola bottling building on Block 19. Initial talks

Figure 4.1 – Aerial View of Site 1

between the City, Argosy, and Mr. Remson have yielded a possible agreement in which Argosy would donate a portion of the property, and Mr. Remson has prepared some preliminary renderings that illustrate the potential of placing a parking garage on this site. This concept is show in ***Figure 4.2***.

One of the primary concerns that Mr. Remson had with constructing a parking structure on this site was that the two existing City garages on Blocks 9b and 15 front Government Street with a nondescript facade. There is a danger in that constructing the same type structure on the south side of the road would not be aesthetically pleasing, and would further the image of Government Street as a high-speed, auto-oriented corridor. The rendering shown on the following page addresses those concerns and demonstrates a potential resolution of the issue. The concept shows a view looking westbound on Government Street. France Street would still exist as a through street with the structure constructed above. Retail shops and restaurants could be developed fronting Government Street as an integral part of the garage structure, creating activity and articulation at a pedestrian scale along the street.

This site would allow for the highest number of potential parking spaces of the three candidate sites and would provide parking for a number of public and private uses, including the River Center, Argosy Casino, Sheraton Hotel, and U.S.S. Kidd. However, Government Street would require a significant image shift from auto-oriented arterial and a hostile barrier for those pedestrians attempting to traverse it, to a 'livable' street attractive to the pedestrian customers that would support the new businesses. Articulation of the garage frontage with storefronts will create pedestrian activity, a signal to the motorists that this street is about people, not simply a auto-carrying conduit. Streetscape, enclosure, and traffic calming measures could also be employed along Government Street to provide this livable image.

It is important to note that Argosy Casino is exploring opportunities to add a private parking structure on their site in order to discontinue using the surface parking on Blocks 26a and 26b that are currently leasing annually. The site that they are studying, independently of this analysis, is on Block 17; additionally, they also have a free parking garage on Block 27. However, average day utilization in that garage is relatively low, due in part to its location in relation to the casino entrance.

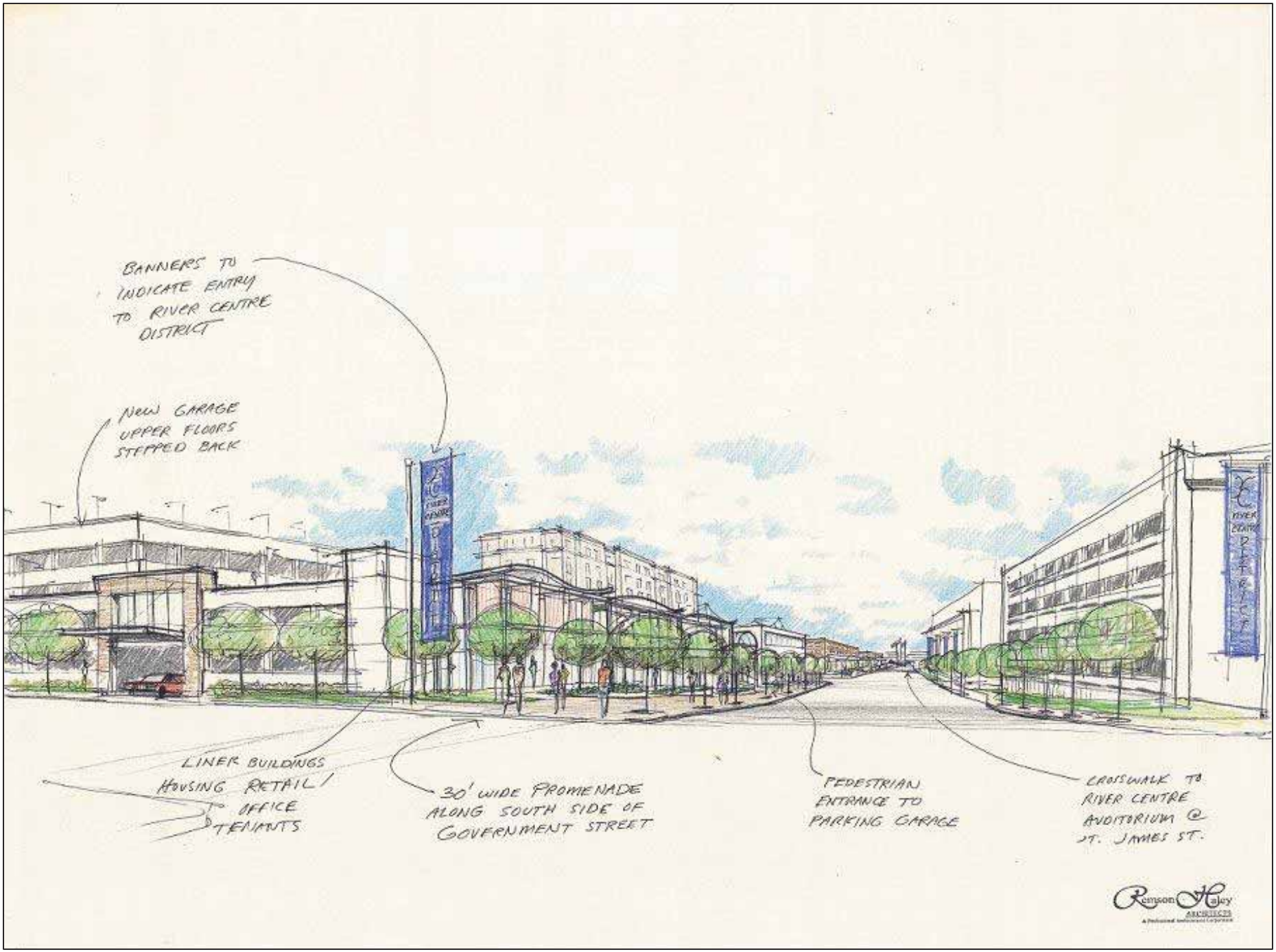


Figure 4.2 - Chris Remson Rendering for Site 1

Site 3 (Sub-Area 3)

Of the three potential sites, Site 3 is the most centrally located within the study area. This site is located immediately north of Block 15. As such, it could expect the most amount of "spillover" usage from adjacent sub-areas for patrons who walk further than the assumed 1,500 foot radius. An aerial view of Site 3 is shown in ***Figure 4.3***.

Figure 4.3 – Aerial View of Site 3

The Downtown Development District (DDD) has provided several graphics that show the footprints of each of the potential parking structure sites. The areas are listed on ***Table 3.6*** below:

Table 3.6 – Footprint Size of Potential Parking Garages

Site	Description	Approximate Footprint Size (sq. ft.)
1-A	Block 24	66,000
1-B	Blocks 19 & 24	125,000
3-A	Block 15 sans Lawyers Office	48,300
3-B	Block 15	56,000
4	Block 11	51,000

As shown in the table, Site 3 has a much smaller footprint (compared to Site 1) available for construction of a new facility. However, it is assumed that this site could be constructed as an addition to the existing 885-space parking structure in Block 15, providing a large central parking pool that would serve not only the Convention Center, but would be centrally located to provide parking for uses in both Sub-Areas 1 and 4 as well.

Additionally, this location has no hostile roadway barriers to pedestrian movements to and from the Convention Center, as does Site 1.

Recommendation

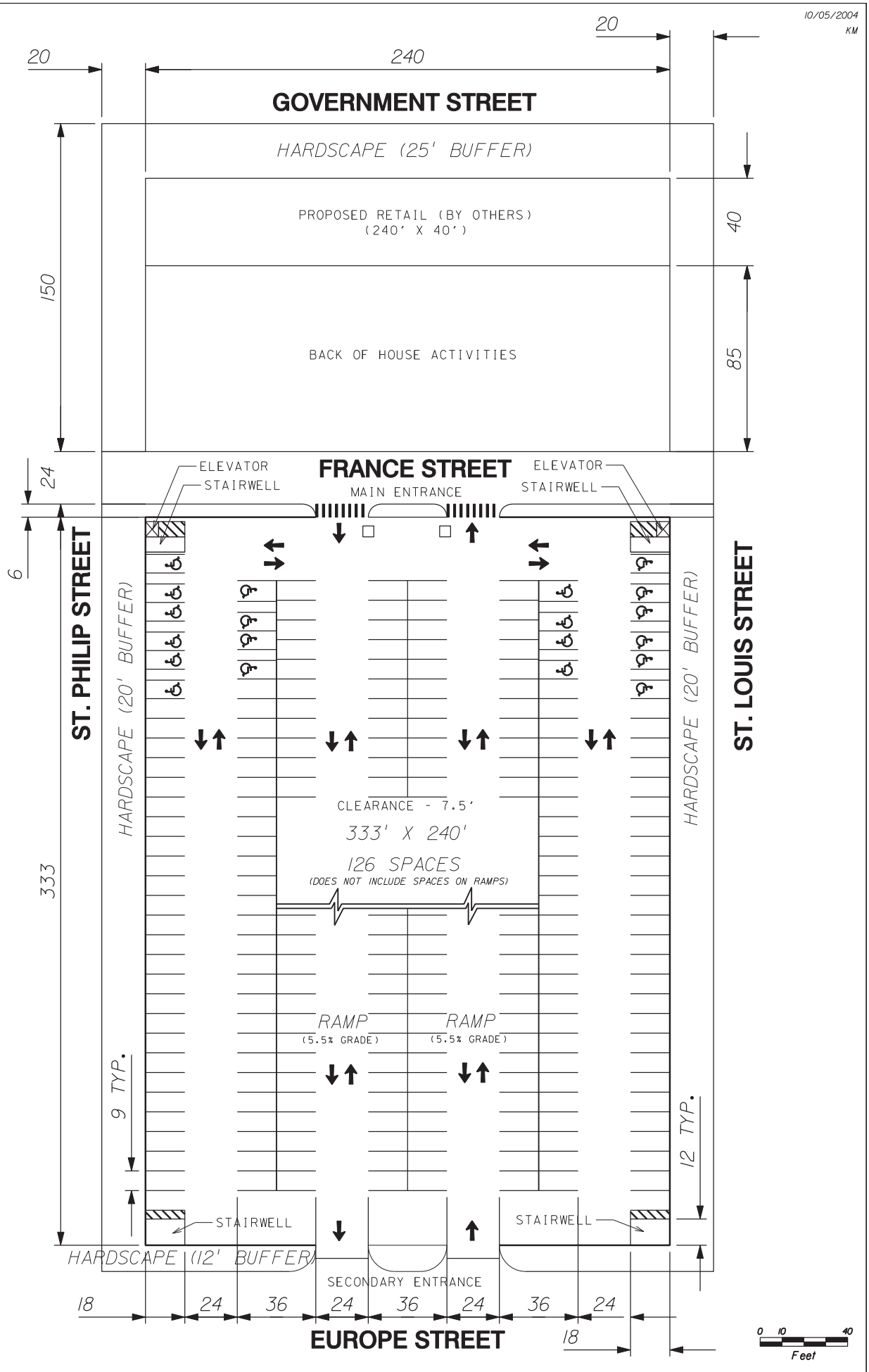
The modeled parking demand shows that Site 1 demonstrates a slight advantage in parking demand over Site 3. Other advantages of Site 1 are listed as follows:

- Site 1 allows for a greater number of parking spaces due to the larger footprint.
- Site 1 creates an opportunity for mixed use facilities attached to the site.
- Site 1 is centrally located to visitor destinations such as the convention center, Sheraton Hotel and Argosy Casino. A new parking garage will allow the city to build in context with the character that is desired Downtown.
- A mixed use of garage and retail could be a catalyst for redevelopment in the adjacent blocks that currently have undesirable land uses.
- It is likely that the current landowners of the subject blocks are willing to cooperate on the proposal with the possibility of donating land for construction on this site.

5.0 Garage Site Concept

Site 1 Parking Garage Design

The proposed garage at Site 1 was designed using Chris Remson's plan as a guide for the garage concept. Government Street is the northern boundary to the garage site. In the design, frontage space was allotted along Government Street for the construction of retail space to be done by other parties. The garage can accommodate a total of 1,314 spaces on five levels in the following manner: The first two levels of parking will be located on Block 24, with block 19 being used for retail back of house activities such as loading docks and dumpsters. Levels 3 and 4 will expand to use both Blocks 24 and 19 and the upper level (rooftop) will be similar in concept to the second level. The design concept is illustrated on ***Figures 5.1*** through ***5.3***.



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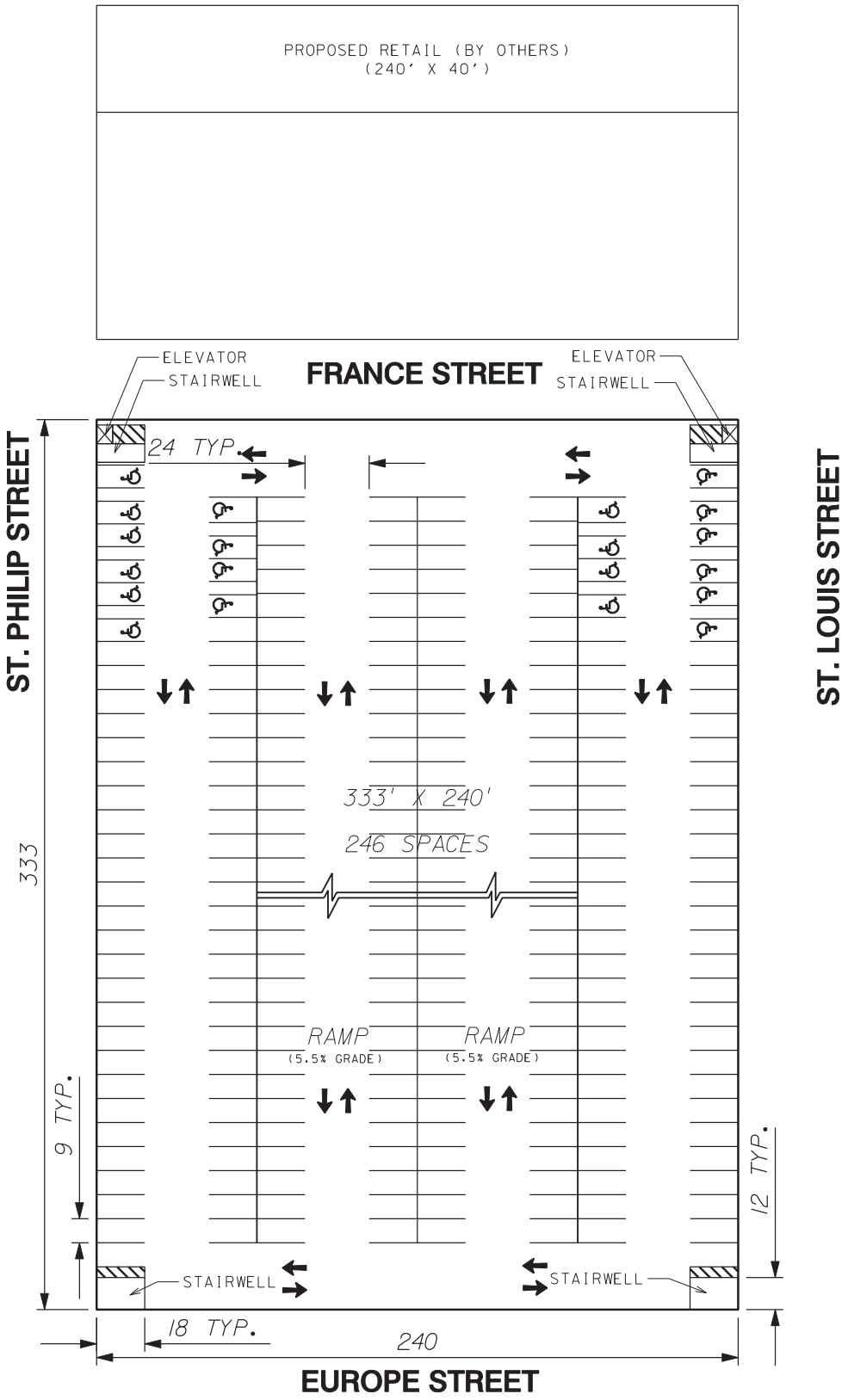
SITE #1 CONCEPTUAL LAYOUT - GROUND FLOOR

FIGURE 5.1

10/05/2004
KM



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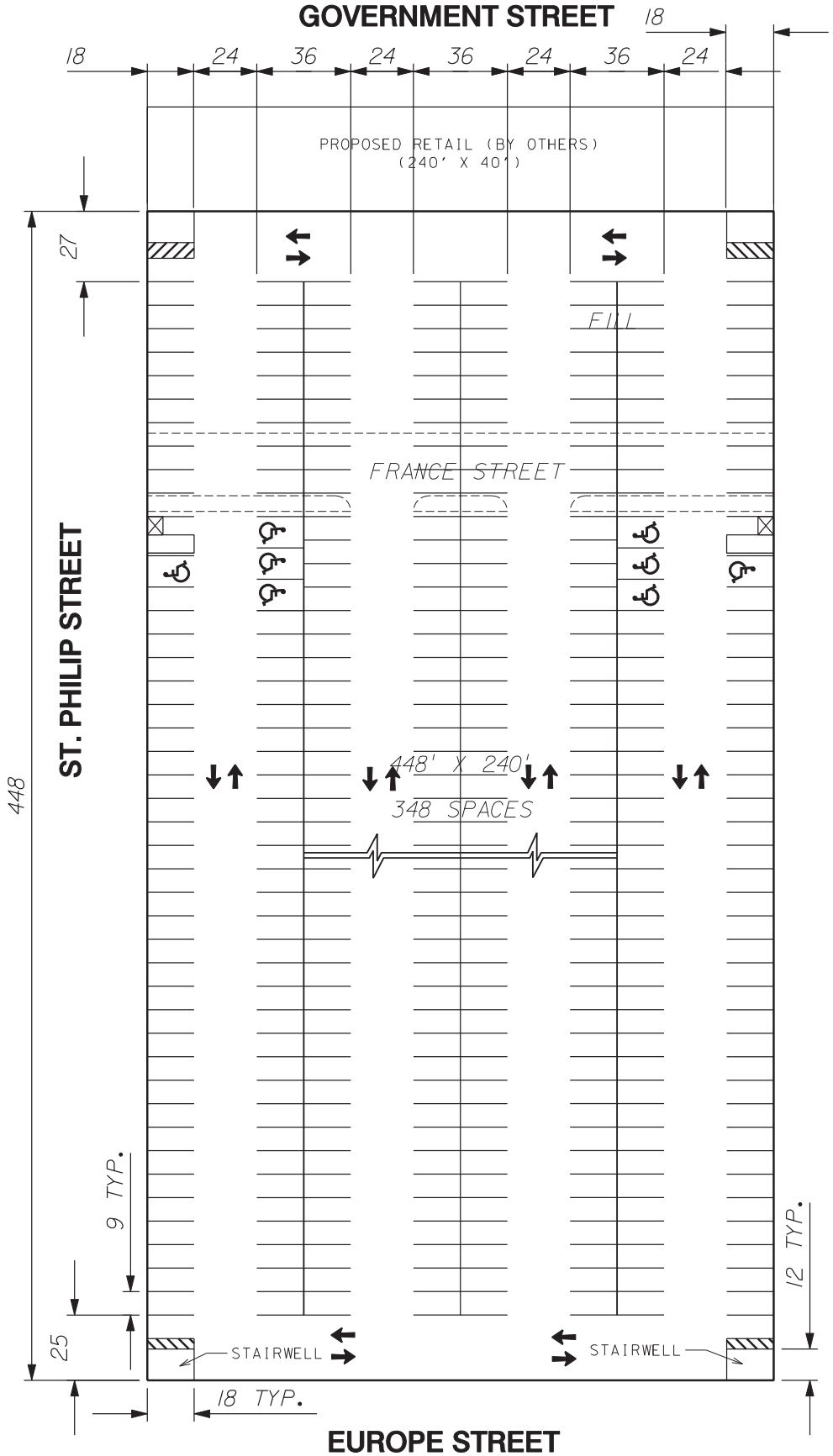
SITE #1 CONCEPTUAL LAYOUT - 2ND FLOOR

FIGURE 5.2

10/05/2004
KM



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SITE #1 CONCEPTUAL LAYOUT - 3rd+ FLOOR

FIGURE 5.3

Site 3 Parking Garage Design

The alternatively proposed garage at Site 3 would be built as an addition to an existing parking garage located in Block 15. The concept allows for the new garage to be space efficient by using the access system and ramps in the existing garage. Two different designs were created for this concept; one employing perpendicular (90°) parking spaces and the other using angled parking, as illustrated in ***Figure 5.4***. The perpendicular parking design created 148 spaces per floor summing to 740 spaces for the entire garage, while the angled parking design created 138 spaces per floor, which totals to 690 spaces for the entire garage. Therefore, this garage cannot meet the expected demand of 1,383 spaces without multiple additional levels and the incorporation of a ramp system.

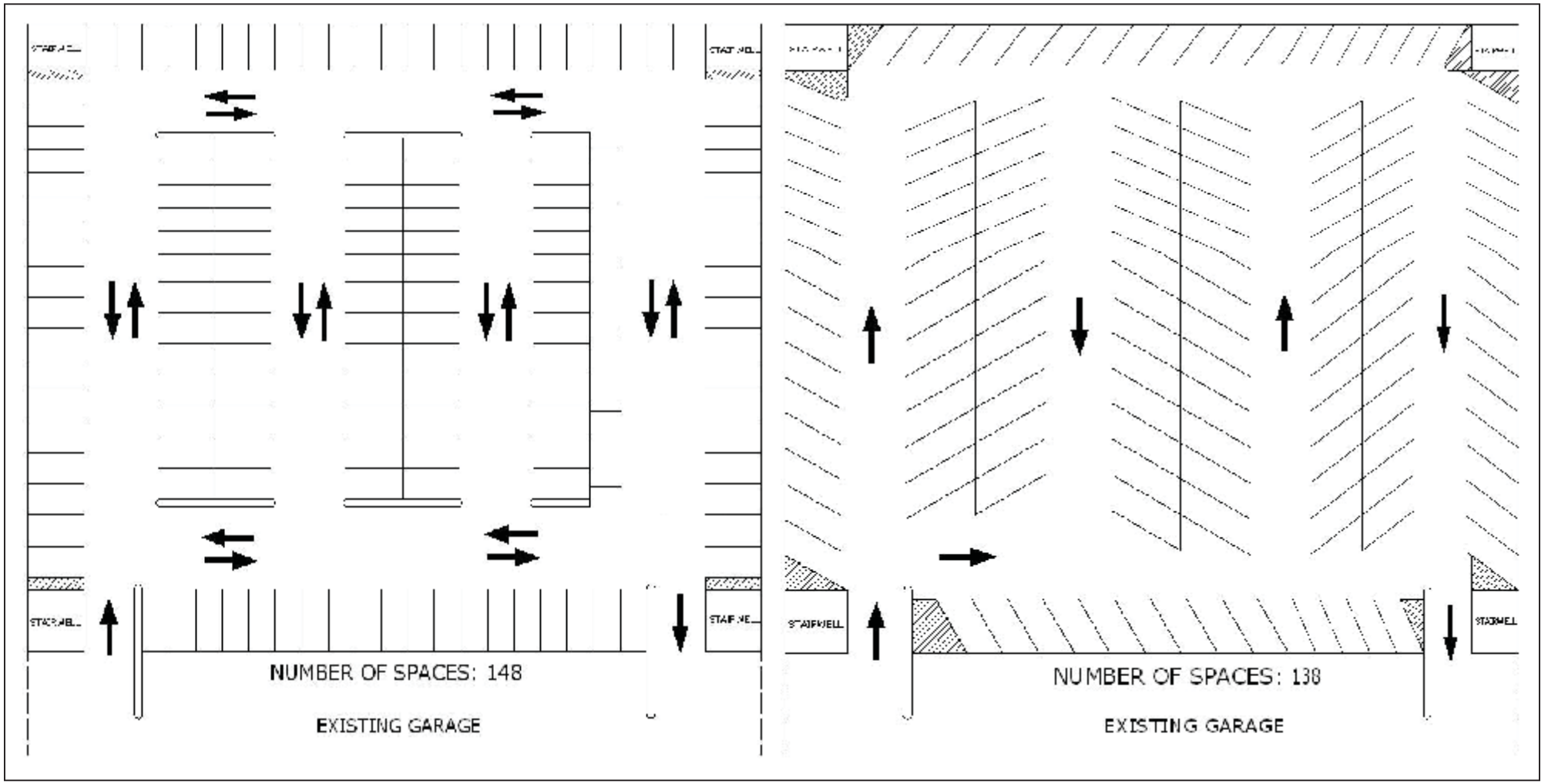

Figure 5.4 - Proposed Site 3 Parking Garage Designs

6.0 Garage Cost & Revenue Estimate

Construction Cost Data

The estimated cost of the parking garage was based upon data provided by the DDD and Plan Baton Rouge. This data shows that the construction costs for two separate parking garages north of Downtown are $15 million each, which equates to $7,500 per space. Another proposed garage is planned to have 468 spaces at a cost of $6.85 million ($14,683 per space). Given the proposed 1,300 space garage in this study, a linear interpolation of the other garages yields a rate of approximately $11,000 per space. This cost per space was utilized for the financial analysis.

Parking Financial Feasibility Study

A series of financial pro formas were developed for the Baton Rouge Convention Center parking structure based on a set of design estimates for attendance at events. ***Table 6.1*** lists an estimate of typical first year events that can be expected at the Convention Center during a stabilized year of events, typically representing a stabilized projection about three years after initial opening of the River Center Expansion. This data is based on the Rochester Convention Center estimates.

In total, approximately 65 events are estimated and about 240,000 attendees in the third year of operation. The types of events are characterized by:

- Trade Shows (professional, associations, etc.);
- Public Shows (sports show, boat shows, etc.);
- Corporate Meetings; and
- Entertainment (concerts, Ice Capades, etc.)

Each event type has varying parking demand associated with it both in terms of how many days the show is open and whether or not the events are open in the evening and/or weekends. As an example, trade shows are further detailed by whether they are national, regional or local events. National events are comprised of a higher number of attendees that fly to Baton Rouge and arrive by taxi or hotel shuttle rather than driving their own car as one might do for a regional or state event. Consequently, the parking demand tends to be proportionately lower for national events than state events.

Furthermore, public shows tend to draw more locals by car, but have higher auto occupancies than corporate meetings that may have single occupancy attendees driving their own cars or rental cars. In addition, public shows tend to be larger in terms of attendance and therefore open in the evenings and weekends as opposed to corporate meetings that tend to be scheduled during the workweek hours.

The characteristics of each event type are modeled in ***Appendix*** Tables 1 through 10. The attendance and related parking demand characteristics listed in ***Appendix*** Tables 1 through 10 were applied to the attendance show design estimates in table 1 to estimate the parking demand peak periods.

Table 6.2 provides an estimate of how the attendance varies by month, further assisting in the preparation of the design day parking demand estimates as well as estimates representing annual attendance by event for the purposes of estimating revenue from parking charges.

Table 6.1
PROJECTED ANNUAL CONVENTION CENTER ATTENDANCE - Persons*
BATON ROUGE PARKING GARAGE STUDY

Size Range	Trade Shows National	Trade Shows Regional	Trade Shows State	Public Shows	Corporate Meetings	Entertainment	Combined
Under 500 Persons							
Number of Events	3	3	3	1	18	1	29
Total Attendance	1,101	1,425	1,140	356	6,138	400	10,560
Average Attendance	367	475	380	356	341	400	364
500-999 Persons							
Number of Events	2	1	3	1	6	1	14
Total Attendance	1,200	850	1,503	750	3,834	628	8,765
Average Attendance	600	850	501	750	639	628	626
1,000 to 1,999 Persons							
Number of Events	1	1	3	1	0	0	6
Total Attendance	1,200	1,225	3,360	1,394	0	0	7,179
Average Attendance	1,200	1,225	1,120	1,394	0	0	1,197
2,000 to 4,999 Persons							
Number of Events	0	0	7	2	0	0	9
Total Attendance	0	0	16,996	5,000	0	0	21,996
Average Attendance	0	0	2,428	2,500	0	0	2,444
5,000 to 9,999 Persons							
Number of Events	0	0	0	0	0	0	0
Total Attendance	0	0	0	0	0	0	0
Average Attendance	0	0	0	0	0	0	0
10,000 to 19,999 Persons							
Number of Events	0	0	0	1	0	0	1
Total Attendance	0	0	0	15,000	0	0	15,000
Average Attendance	0	0	0	15,000	0	0	15,000
20,000 to 29,999 Persons							
Number of Events	0	0	0	3	0	0	3
Total Attendance	0	0	0	67,500	0	0	67,500
Average Attendance	0	0	0	22,500	0	0	22,500
30,000 to 39,999 Persons							
Number of Events	0	0	0	1	0	0	1
Total Attendance	0	0	0	30,000	0	0	30,000
Average Attendance	0	0	0	30,000	0	0	30,000
40,000 to 49,999 Persons							
Number of Events	0	0	0	2	0	0	2
Total Attendance	0	0	0	80,000	0	0	80,000
Average Attendance	0	0	0	40,000	0	0	40,000
Combined Events							
Number of Events	**6**	**5**	**16**	**12**	**24**	**2**	**65**
Total Attendance	**3,501**	**3,500**	**22,999**	**200,000**	**9,972**	**1,028**	**241,000**
Average Attendance	**584**	**700**	**1,437**	**16,667**	**416**	**514**	**3,708**

***based on projected attendance at Rochester Convention Center**

Table 6.2 - Estimated Convention Center Attendance by Month and Type of Event – Future Stabilized

Month	Trade		Public		Other		Total Persons
	Percent	Persons	Percent	Persons	Percent	Persons	
January	2.0%	600	7.5%	15,000	2.5%	275	15,875
February	2.0%	600	35.0%	70,000	4.5%	495	71,095
March	6.0%	1,800	4.5%	9,000	3.0%	330	11,130
April	17.5%	5,250	20.0%	40,000	13.5%	1,485	46,735
May	17.5%	5,250	2.0%	4,000	23.5%	2,585	11,835
June	5.0%	1,500	2.0%	4,000	3.0%	330	5,830
July	5.0%	1,500	1.5%	3,000	10.0%	1,100	5,600
August	2.0%	600	1.5%	3,000	2.5%	275	3,875
September	12.0%	3,600	3.0%	6,000	2.5%	275	9,875
October	17.0%	5,100	12.5%	25,000	16.5%	1,815	31,915
November	14.0%	4,200	10.0%	20,000	7.0%	770	24,970
December	0.0%	0	0.5%	1,000	11.5%	1,265	2,265
Total	100.0%	30,000	100.0%	200,000	100.0%	11,000	241,000

Finally, ***Table 6.3*** provides an estimate of the projected high and average attendance by event during the first year of stabilized demand (year 3). This information was used to generate the expected annual parking revenue that can be generated in the parking structure.

Table 6.4 and ***6.5*** are pro formas depicting the estimated revenue, net operating income, maintenance and operating costs, debt service and net income or loss over a 30 year bond period. ***Table 6.4*** is based on the average attendance projections and ***Table 6.5*** is based on the high attendance projections. There are also other potential users of the proposed parking structure that include the Arena and the Theater as discussed previously in this report.

The pro formas are based on the following financial input parameters:

- A 1,314 space garage
- A construction cost of $10,765 per space based on local recent construction costs;
- A total construction costs of $14,145,210;
- Parking structure opened in 2008;
- Bond term of 30 years;
- Interest rate of 5.5 percent;
- Debt service of $973,267;
- Maintenance and operating costs of $400 per space;
- Annual cost escalation of 4 percent per year; and
- Increase in parking rates averaging 4 percent per year.

The revenue projections were based on the following existing rate structure:

- Monthly parking permit rate of $30;
- Daily maximum during the daytime hours of $4.00;
- Evening maximum rate of $3.00;
- Hourly rate of $1.00; and
- Theater and Arena flat rate of $4.00.

Based on the design estimate described earlier and depicted in ***Tables 6.1*** and ***6.2***, the stabilized attendance estimates (year 3) are:

- 80 employee permits (monthly);
- 58,221 daily Convention Center visitors (annual);
- 24,227 evening Convention Center visitors(annual);
- 100 parkers in the structure during the "peak one hour period";
- 34,545 parkers related to Theater events (annual); and
- 59,167 parkers related to the Arena events (annual).

As shown in ***Tables 6.4*** and ***6.5***, the auto occupancy for Theater and Arena parking is estimated at 2.2 and 2.4 person per car, respectively.

Profit/ (Loss) Projections

The gross parking revenues are calculated by multiplying the parking demand, by user-type, by the parking rates. As shown in ***Table 6.4***, Average Attendance, the third year stabilized revenue is estimated at $830,241. The maintenance and operating (M&O) cost were estimated at $585,544, resulting in a net operating revenue after M&O of $244,698. This net revenue is applied against the debt service of $973,267, resulting in a shortfall of $728,569 and a third year accumulated loss of over $2.3 million. This trend continues until year 2023 when the revenue begins to cover both the M&O and the debt service. The 30 year net accumulated loss is estimated at $493,305 after which the debt is retired and the structure begins to be self-supporting.

However, there will likely be costs related to repair and renovation that could result in the need for refinancing to bonds to improve the cash flow.

The high attendance scenario does not significantly change the outlook (***Table 6.5***) in terms of when the structure begins to be self-supporting. However, the 30 year outlook changes dramatically in that the net accumulated loss turns to a profit of approximately $5.4 million, a swing of about $6 million.

Table 6.6 simply looks at the impact of reducing the number of elevated parking levels by one resulting in a reduction from 1,314 to about 966 spaces. The result is a much higher utilization rate and lower debt service and M&O costs. The break-even point is anticipated in year 2016 rather than 2023 or 2021. The net accumulated profit after 30 years is projected to be about $15.3 million.

It is important to note that under the full buildout scenario of the land uses assumed in this study, the full 1,314-space garage will be needed to adequately fulfill the parking demands within the area of influence. However, one option for minimizing the initial cost for construction of the recommended parking garage would be to construct a garage that can be expanded at a later time. The 966-space garage alternative that is included in this study represents the approximate 100% utilization that is forecasted for future conditions.

Another advantage for constructing the smaller sized garage would be if any of the projected future land uses did not create the demand that is anticipated, the smaller garage results in a lower capital expenditure for the City. Should the smaller facility need to be expanded in the future, though, the total cost for construction of the smaller garage (966 spaces) plus the expansion would be significantly greater than constructing the larger garage (1,314 spaces) initially.

Intermodal Transportation Funding Strategies

The scenario outlined above presents one possible option for funding the proposed parking structure. Another possibility would be to associate the parking garage with a potential intermodal facility to acquire subsidized funding. Many strategies exist to accomplish this task. Included in the ***Appendix*** of this report are several papers and case studies published by Transit Cooperative Research Program (TCRP) and Federal Transit Administration (FTA) which outline some of the funding strategies available.

Table 6.3
ESTIMATED PARKING REQUIREMENTS FOR TYPICAL EVENTS - Under 2,000 Persons
BATON ROUGE PARKING GARAGE STUDY

Type and Size of Show	Type	Range	No. of Weekdays Days	No. of Weekdays Evenings	No. of Wkend Days	Attendance (Total Persons) Average	Attendance (Total Persons) High	Peak No. of Parkers Wkday (Mon-Fri) 9am-5pm	Peak No. of Parkers Wkday (Mon-Fri) 6pm-9pm	Peak No. of Parkers Wkends (Sat-Sun) 9am-5pm	Peak No. of Parkers Wkends (Sat-Sun) 6pm-9pm	Average No. of Exhibit Parkers	Weekday Peak 9am-5pm	Other Times Peak	Annual Parkers Daytime	Annual Parkers Evening
Under 500 Persons																
Trade, National	I	Average	1	0	0	367		23	0	0	0	20	43		50	0
		High	1	0	0		459	29	0	0	0	25	54		63	0
Trade, Regional	II	Average	1	0	0	475		120	0	0	0	50	170		206	0
		High	1	0	0		500	126	0	0	0	70	196		234	0
Trade, State/Local	III	Average	1	0	0	380		141	0	0	0	50	191		233	0
		High	1	0	0		475	176	0	0	0	70	246		299	0
Public	V-A	Average	1	1	0	356		52	36	0	0	50	102	86	118	47
		High	1	1	0		445	65	45	0	0	70	135	115	155	59
Corporate Meeting	IX	Average	1	0	0	341		69	0	0	0	20	89		110	0
		High	1	0	0		426	86	0	0	0	25	111		137	0
Entertainment	X	Average	0	1	0	400		0	104	0	0	30	30	134	0	135
		High	0	1	0		500	0	131	0	0	40	40	171	0	170
500 to 999 Persons																
Trade, National	I	Average	2	0	0	600		23	0	0	0	20	43		100	0
		High	2	0	0		750	29	0	0	0	25	54		125	0
Trade, Regional	II	Average	2	0	0	850		128	0	0	0	50	178		433	0
		High	2	0	0		999	151	0	0	0	70	221		533	0
Trade, State/Local	III	Average	2	0	0	501		112	0	0	0	50	162		391	0
		High	2	0	0		626	140	0	0	0	70	210		504	0
Public	V-A	Average	1	1	0	750		109	77	0	0	50	159	127	192	100
		High	1	1	0		938	136	96	0	0	70	206	166	247	125
Corporate Meeting	IX	Average	1	0	0	639		130	0	0	0	20	150		189	0
		High	1	0	0		799	162	0	0	0	25	187		236	0
Entertainment	X	Average	0	1	0	628		0	164	0	0	30	30	194	0	213
		High	0	1	0		785	0	205	0	0	40	40	245	0	267
1,000 to 1,999 Persons																
Trade, National	I	Average	2	0	0	1,200		46	0	0	0	100	146	0	320	0
		High	2	0	0		1,500	57	0	0	0	125	182	0	398	0
Trade, Regional	II	Average	2	0	0	1,225		185	0	0	0	125	310	0	731	0
		High	2	0	0		1,531	232	0	0	0	140	372	0	883	0
Trade, State/Local	III	Average	3	0	0	1,120		175	0	0	0	125	300	0	1,058	0
		High	3	0	0		1,400	218	0	0	0	140	358	0	1,270	0
Public	V-A	Average	1	1	0	1,394		202	142	0	0	150	352	292	413	185
		High	1	1	0		1,743	253	178	0	0	160	413	338	489	231
Corporate Meeting	IX	Average	1	0	0	1,278		259	0	0	0	40	299	0	377	0
		High	1	0	0		1,598	324	0	0	0	50	374	0	471	0
Entertainment	X	Average	0	1	0	1,500		0	392	0	0	40	40	432	0	510
		High	0	1	0		1,875	0	490	0	0	50	50	540	0	637
2,000 to 4,999 Persons																
Trade, State/Local	III	Average	3	0	0	2,428		379	0	0	0	200	579	0	2,078	0
		High	3	0	0		3,035	473	0	0	0	230	703	0	2,535	0
Public	V-A	Average	3	3	0	2,500		152	107	0	0	100	252	207	893	417
		High	3	3	0		3,125	190	134	0	0	130	320	264	1131	523
10,000 to 19,999 Persons																
Public	VII-C	Average	5	5	3	15,000		255	180	420	285	200	455	620	8,620	4,836
		High	5	5	3		18,750	319	225	525	356	250	569	775	10,778	6,042
20,000 to 29,999 Persons																
Public	VII-C	Average	2	2	1	22,500		855	585	1,732	1,215	200	1,055	1,932	10,689	7,020
		High	2	2	1		28,125	1,069	731	2,166	1,519	250	1,319	2,416	13,367	8,775
30,000 to 39,999 Persons																
Public	VI-B	Average	1	0	2	30,000		1,590	0	3,240	0	300	1,890	3,540	19,737	0
		High	1	0	2		37,500	1,988	0	4,050	0	350	2,338	4,400	24,598	0
40,000 to 50,000 Persons																
Public	VIII-D	Average	0	5	4	40,000		0	920	1,720	0	300	300	1,220	10,144	10,764
		High	0	5	4		50,000	0	1,150	2,150	0	360	360	1,510	12,620	13,455
														Average	**57,080**	**24,227**
														High	**71,071**	**30,284**

Table 6.4
FINANCIAL PROFORMA FOR CONVENTION CENTER ATTENDEES/EXHIBITORS
BATON ROUGE PARKING GARAGE STUDY

AVERAGE ATTENDANCE **1,314 space garage** $14,145,210

		Fiscal Year														
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Escalation of Fees	1.00	1.03	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Escalation of M&O	1.00	1.03	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Growth in Parking Demand	1.00	1.00	1.00	1.00	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Daily Parkers in Garage																
Employee, monthly		60	72	80	82	83	85	87	88	90	92	94	96	98	99	101
Conv Ctr Visitors/Daytime (annual)		42,810	51,372	57,080	58,221	59,386	60,573	61,785	63,020	64,281	65,567	66,878	68,215	69,580	70,971	72,391
Conv Ctr Visitors/Evening (annual)		18,170	21,804	24,227	24,711	25,206	25,710	26,224	26,748	27,283	27,829	28,386	28,953	29,532	30,123	30,725
Visitor, hourly (peak hour)		75	90	100	102	104	106	108	110	113	115	117	120	122	124	127
Theater (annual - 2.2 persons / car)		34,545	34,545	34,545	35,236	35,941	36,660	37,393	38,141	38,904	39,682	40,476	41,285	42,111	42,953	43,812
Arena (annual - 2.4 persons / car)		59,167	59,167	59,167	60,350	61,557	62,788	64,044	65,325	66,631	67,964	69,323	70,710	72,124	73,566	75,038
Fee Schedule																
Monthly	$30.00	30.90	32.14	33.42	34.76	36.15	37.59	39.10	40.66	42.29	43.98	45.74	47.57	49.47	51.45	53.51
Daily Maximum (daytime)	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Daily Maximum (evening)	$3.00	3.09	3.21	3.34	3.48	3.61	3.76	3.91	4.07	4.23	4.40	4.57	4.76	4.95	5.15	5.35
Hourly	$1.00	1.03	1.07	1.11	1.16	1.20	1.25	1.30	1.36	1.41	1.47	1.52	1.59	1.65	1.72	1.78
Theater Events	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Arena Events	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Gross Revenue (Annual)																
Employee, monthly		22,248	27,766	32,085	34,035	36,105	38,300	40,628	43,099	45,719	48,499	51,448	54,576	57,894	61,414	65,148
Conv Ctr Visitors/Daytime (annual)		176,376	220,117	254,358	269,823	286,228	303,630	322,091	341,674	362,448	384,485	407,862	432,660	458,965	486,870	516,472
Conv Ctr Visitors/Evening (annual)		56,146	70,070	80,969	85,892	91,115	96,654	102,531	108,765	115,378	122,393	129,834	137,728	146,102	154,985	164,408
Visitor, hourly (peak hour)		31,364	39,142	45,230	47,980	50,898	53,992	57,275	60,757	64,451	68,370	72,527	76,936	81,614	86,576	91,840
Theater (annual)		142,327	148,020	153,941	163,301	173,229	183,762	194,935	206,787	219,359	232,696	246,844	261,852	277,773	294,662	312,577
Arena (annual)		243,767	253,517	263,658	279,688	296,693	314,732	333,868	354,167	375,701	398,543	422,775	448,480	475,747	504,672	535,357
Total		672,227	758,632	830,241	880,720	934,268	991,071	1,051,328	1,115,249	1,183,056	1,254,986	1,331,289	1,412,232	1,498,095	1,589,179	1,685,802
M&O Expenses	$400	541,368	563,023	585,544	608,965	633,324	658,657	685,003	712,403	740,899	770,535	801,357	833,411	866,748	901,418	937,474
Net Operating Revenue		130,859	195,609	244,698	271,755	300,944	332,414	366,325	402,846	442,157	484,451	529,932	578,820	631,348	687,762	748,327
Debt Service																
$10,765 per space **5.5%** interest **30** years		973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267
Net Operating Income		(842,408)	(777,658)	(728,569)	(701,512)	(672,323)	(640,852)	(606,942)	(570,421)	(531,110)	(488,816)	(443,334)	(394,446)	(341,919)	(285,505)	(224,939)
Debt Serice Coverage		0.13	0.20	0.25	0.28	0.31	0.34	0.38	0.41	0.45	0.50	0.54	0.59	0.65	0.71	0.77
Accumulated Balance		(842,408)	(1,620,065)	(2,348,634)	(3,050,147)	(3,722,470)	(4,363,322)	(4,970,264)	(5,540,685)	(6,071,795)	(6,560,611)	(7,003,945)	(7,398,391)	(7,740,311)	(8,025,815)	(8,250,755)

Table 6.4 continued
FINANCIAL PROFORMA FOR CONVENTION CENTER ATTENDEES/EXHIBITORS
AVERAGE ATTENDANCE

	Fiscal Year														
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Escalation of Fees	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Escalation of M&O	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Growth in Parking Demand	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Daily Parkers in Garage															
Employee, monthly	103	106	108	110	112	114	117	119	121	124	126	129	131	134	137
Conv Ctr Visitors/Daytime (annual)	73,839	75,315	76,822	78,358	79,925	81,524	83,154	84,817	86,514	88,244	90,009	91,809	93,645	95,518	97,428
Conv Ctr Visitors/Evening (annual)	31,340	31,967	32,606	33,258	33,923	34,602	35,294	36,000	36,720	37,454	38,203	38,967	39,747	40,542	41,352
Visitor, hourly (peak hour)	129	132	135	137	140	143	146	149	152	155	158	161	164	167	171
Theater (annual - 2.2 persons / car)	44,688	45,582	46,494	47,424	48,372	49,339	50,326	51,333	52,359	53,407	54,475	55,564	56,675	57,809	58,965
Arena (annual - 2.4 persons / car)	76,538	78,069	79,631	81,223	82,848	84,505	86,195	87,919	89,677	91,470	93,300	95,166	97,069	99,011	100,991
Fee Schedule															
Monthly	55.65	57.88	60.19	62.60	65.10	67.71	70.41	73.23	76.16	79.21	82.37	85.67	89.10	92.66	96.37
Daily Maximum (daytime)	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Daily Maximum (evening)	5.56	5.79	6.02	6.26	6.51	6.77	7.04	7.32	7.62	7.92	8.24	8.57	8.91	9.27	9.64
Hourly	1.85	1.93	2.01	2.09	2.17	2.26	2.35	2.44	2.54	2.64	2.75	2.86	2.97	3.09	3.21
Theater Events	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Arena Events	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Gross Revenue (Annual)															
Employee, monthly	69,109	73,310	77,768	82,496	87,512	92,832	98,477	104,464	110,815	117,553	124,700	132,282	140,325	148,856	157,907
Conv Ctr Visitors/Daytime (annual)	547,874	581,184	616,520	654,005	693,768	735,950	780,695	828,161	878,514	931,927	988,589	1,048,695	1,112,455	1,180,093	1,251,842
Conv Ctr Visitors/Evening (annual)	174,404	185,008	196,256	208,189	220,847	234,274	248,518	263,628	279,657	296,660	314,697	333,830	354,127	375,658	398,498
Visitor, hourly (peak hour)	97,424	103,347	109,631	116,296	123,367	130,868	138,825	147,265	156,219	165,717	175,793	186,481	197,819	209,846	222,605
Theater (annual)	331,582	351,742	373,128	395,814	419,879	445,408	472,489	501,216	531,690	564,017	598,309	634,686	673,275	714,210	757,634
C	567,906	602,435	639,063	677,918	719,135	762,859	809,241	858,443	910,636	966,002	1,024,735	1,087,039	1,153,131	1,223,242	1,297,615
Total	1,788,298	1,897,027	2,012,366	2,134,718	2,264,509	2,402,191	2,548,244	2,703,177	2,867,530	3,041,876	3,226,822	3,423,013	3,631,132	3,851,905	4,086,101
M&O Expenses	974,973	1,013,972	1,054,531	1,096,712	1,140,581	1,186,204	1,233,652	1,282,998	1,334,318	1,387,691	1,443,198	1,500,926	1,560,963	1,623,402	1,688,338
Net Operating Revenue	813,325	883,055	957,835	1,038,006	1,123,928	1,215,987	1,314,592	1,420,179	1,533,212	1,654,185	1,783,624	1,922,087	2,070,169	2,228,503	2,397,763
Debt Service															
$10,765	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267
5.5%															
30															
Net Operating Income	(159,942)	(90,212)	(15,432)	64,739	150,661	242,720	341,325	446,912	559,946	680,919	810,357	948,820	1,096,902	1,255,237	1,424,496
Debt Serice Coverage	0.84	0.91	0.98	1.07	1.15	1.25	1.35	1.46	1.58	1.70	1.83	1.97	2.13	2.29	2.46
Accumulated Balance	(8,410,696)	(8,500,908)	(8,516,340)	(8,451,601)	(8,300,940)	(8,058,220)	(7,716,894)	(7,269,982)	(6,710,036)	(6,029,118)	(5,218,760)	(4,269,940)	(3,173,038)	(1,917,802)	(493,305)

Table 6.5
Financial Proforma for Convention Center Attendees/Exhibitors
BATON ROUGE PARKING GARAGE STUDY

HIGH ATTENDANCE — **1,314 space garage**

		Fiscal Year														
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Escalation of Fees	1.00	1.03	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Escalation of M&O	1.00	1.03	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Growth in Parking Demand	1.00	1.00	1.00	1.00	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Daily Parkers in Garage																
Employee, monthly		60	72	80	82	83	85	87	88	90	92	94	96	98	99	101
Conv Ctr Visitors/Daytime (annual)		53,303	63,964	71,071	72,492	73,942	75,421	76,929	78,468	80,037	81,638	83,271	84,936	86,635	88,367	90,135
Conv Ctr Visitors/Evening (annual)		22,713	27,255	30,284	30,889	31,507	32,137	32,780	33,435	34,104	34,786	35,482	36,192	36,915	37,654	38,407
Visitor, hourly (peak hour)		75	90	100	102	104	106	108	110	113	115	117	120	122	124	127
Theater (annual - 2.2 persons / car)		34,545	34,545	34,545	35,236	35,941	36,660	37,393	38,141	38,904	39,682	40,476	41,285	42,111	42,953	43,812
Arena (annual - 2.4 persons / car)		59,167	59,167	59,167	60,350	61,557	62,788	64,044	65,325	66,631	67,964	69,323	70,710	72,124	73,566	75,038
Fee Schedule																
Monthly	$30.00	30.90	32.14	33.42	34.76	36.15	37.59	39.10	40.66	42.29	43.98	45.74	47.57	49.47	51.45	53.51
Daily Maximum (daytime)	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Daily Maximum (evening)	$3.00	3.09	3.21	3.34	3.48	3.61	3.76	3.91	4.07	4.23	4.40	4.57	4.76	4.95	5.15	5.35
Hourly	$1.00	1.03	1.07	1.11	1.16	1.20	1.25	1.30	1.36	1.41	1.47	1.52	1.59	1.65	1.72	1.78
Theater Events	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Arena Events	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Gross Revenue (Annual)																
Employee, monthly		22,248	27,766	32,085	34,035	36,105	38,300	40,628	43,099	45,719	48,499	51,448	54,576	57,894	61,414	65,148
Conv Ctr Visitors/Daytime (annual)		219,608	274,071	316,705	335,960	356,387	378,055	401,041	425,424	451,290	478,728	507,835	538,711	571,465	606,210	643,068
Conv Ctr Visitors/Evening (annual)		70,182	87,587	101,212	107,365	113,893	120,818	128,164	135,956	144,222	152,991	162,293	172,160	182,628	193,731	205,510
Visitor, hourly (peak hour)		31,364	39,142	45,230	47,980	50,898	53,992	57,275	60,757	64,451	68,370	72,527	76,936	81,614	86,576	91,840
Theater (annual)		142,327	148,020	153,941	163,301	173,229	183,762	194,935	206,787	219,359	232,696	246,844	261,852	277,773	294,662	312,577
Arena (annual)		243,767	253,517	263,658	279,688	296,693	314,732	333,868	354,167	375,701	398,543	422,775	448,480	475,747	504,672	535,357
Total		729,496	830,103	912,831	968,331	1,027,205	1,089,659	1,155,911	1,226,190	1,300,742	1,379,827	1,463,721	1,552,715	1,647,120	1,747,265	1,853,499
M&O Expenses	$400	541,368	563,023	585,544	608,965	633,324	658,657	685,003	712,403	740,899	770,535	801,357	833,411	866,748	901,418	937,474
Net Operating Revenue		188,128	267,081	327,287	359,365	393,881	431,002	470,907	513,787	559,843	609,292	662,364	719,304	780,373	845,848	916,025
Debt Service																
$10,765 per space **5.5%** interest **30** years		973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267
Net Operating Income		(785,139)	(706,186)	(645,980)	(613,901)	(579,385)	(542,264)	(502,359)	(459,480)	(413,424)	(363,975)	(310,903)	(253,963)	(192,894)	(127,419)	(57,242)
Debt Serice Coverage		0.19	0.27	0.34	0.37	0.40	0.44	0.48	0.53	0.58	0.63	0.68	0.74	0.80	0.87	0.94
Accumulated Balance		(785,139)	(1,491,325)	(2,137,304)	(2,751,206)	(3,330,591)	(3,872,856)	(4,375,215)	(4,834,695)	(5,248,119)	(5,612,093)	(5,922,996)	(6,176,959)	(6,369,853)	(6,497,272)	(6,554,514)

Table 6.5 continued
Financial Proforma for Convention Center Attendees/Exhibitors
HIGH ATTENDANCE

	Fiscal Year														
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Escalation of Fees	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Escalation of M&O	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Growth in Parking Demand	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Daily Parkers in Garage															
Employee, monthly	103	106	108	110	112	114	117	119	121	124	126	129	131	134	137
Conv Ctr Visitors/Daytime (annual)	91,938	93,776	95,652	97,565	99,516	101,506	103,537	105,607	107,719	109,874	112,071	114,313	116,599	118,931	121,310
Conv Ctr Visitors/Evening (annual)	39,175	39,958	40,758	41,573	42,404	43,252	44,117	45,000	45,900	46,818	47,754	48,709	49,683	50,677	51,690
Visitor, hourly (peak hour)	129	132	135	137	140	143	146	149	152	155	158	161	164	167	171
Theater (annual - 2.2 persons / car)	44,688	45,582	46,494	47,424	48,372	49,339	50,326	51,333	52,359	53,407	54,475	55,564	56,675	57,809	58,965
Arena (annual - 2.4 persons / car)	76,538	78,069	79,631	81,223	82,848	84,505	86,195	87,919	89,677	91,470	93,300	95,166	97,069	99,011	100,991
Fee Schedule															
Monthly	55.65	57.88	60.19	62.60	65.10	67.71	70.41	73.23	76.16	79.21	82.37	85.67	89.10	92.66	96.37
Daily Maximum (daytime)	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Daily Maximum (evening)	5.56	5.79	6.02	6.26	6.51	6.77	7.04	7.32	7.62	7.92	8.24	8.57	8.91	9.27	9.64
Hourly	1.85	1.93	2.01	2.09	2.17	2.26	2.35	2.44	2.54	2.64	2.75	2.86	2.97	3.09	3.21
Theater Events	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Arena Events	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Gross Revenue (Annual)															
Employee, monthly	69,109	73,310	77,768	82,496	87,512	92,832	98,477	104,464	110,815	117,553	124,700	132,282	140,325	148,856	157,907
Conv Ctr Visitors/Daytime (annual)	682,166	723,642	767,639	814,312	863,822	916,342	972,056	1,031,157	1,093,851	1,160,357	1,230,907	1,305,746	1,385,136	1,469,352	1,558,688
Conv Ctr Visitors/Evening (annual)	218,005	231,260	245,321	260,236	276,058	292,843	310,648	329,535	349,571	370,825	393,371	417,288	442,659	469,572	498,122
Visitor, hourly (peak hour)	97,424	103,347	109,631	116,296	123,367	130,868	138,825	147,265	156,219	165,717	175,793	186,481	197,819	209,846	222,605
Theater (annual)	331,582	351,742	373,128	395,814	419,879	445,408	472,489	501,216	531,690	564,017	598,309	634,686	673,275	714,210	757,634
C	567,906	602,435	639,063	677,918	719,135	762,859	809,241	858,443	910,636	966,002	1,024,735	1,087,039	1,153,131	1,223,242	1,297,615
Total	1,966,192	2,085,736	2,212,549	2,347,072	2,489,774	2,641,152	2,801,734	2,972,080	3,152,782	3,344,471	3,547,815	3,763,522	3,992,344	4,235,079	4,492,572
M&O Expenses	974,973	1,013,972	1,054,531	1,096,712	1,140,581	1,186,204	1,233,652	1,282,998	1,334,318	1,387,691	1,443,198	1,500,926	1,560,963	1,623,402	1,688,338
Net Operating Revenue	991,218	1,071,764	1,158,018	1,250,360	1,349,193	1,454,948	1,568,082	1,689,081	1,818,464	1,956,780	2,104,616	2,262,596	2,431,381	2,611,677	2,804,233
Debt Service															
$10,765	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267	973,267
5.5%															
30															
Net Operating Income	17,952	98,497	184,751	277,093	375,926	481,681	594,815	715,815	845,197	983,514	1,131,350	1,289,329	1,458,114	1,638,410	1,830,967
Debt Serice Coverage	1.02	1.10	1.19	1.28	1.39	1.49	1.61	1.74	1.87	2.01	2.16	2.32	2.50	2.68	2.88
Accumulated Balance	(6,536,562)	(6,438,064)	(6,253,313)	(5,976,220)	(5,600,294)	(5,118,613)	(4,523,797)	(3,807,983)	(2,962,785)	(1,979,272)	(847,922)	441,407	1,899,521	3,537,931	5,368,898

Table 6.6
Financial Proforma for Convention Center Attendees/Exhibitors
BATON ROUGE PARKING GARAGE STUDY

AVERAGE ATTENDANCE — **966 space garage**

		Fiscal Year														
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Escalation of Fees	1.00	1.03	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Escalation of M&O	1.00	1.03	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Growth in Parking Demand	1.00	1.00	1.00	1.00	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Daily Parkers in Garage																
Employee, monthly		60	72	80	82	83	85	87	88	90	92	94	96	98	99	101
Conv Ctr Visitors/Daytime (annual)		42,810	51,372	57,080	58,221	59,386	60,573	61,785	63,020	64,281	65,567	66,878	68,215	69,580	70,971	72,391
Conv Ctr Visitors/Evening (annual)		18,170	21,804	24,227	24,711	25,206	25,710	26,224	26,748	27,283	27,829	28,386	28,953	29,532	30,123	30,725
Visitor, hourly (peak hour)		75	90	100	102	104	106	108	110	113	115	117	120	122	124	127
Theater (annual - 2.2 persons / car)		34,545	34,545	34,545	35,236	35,941	36,660	37,393	38,141	38,904	39,682	40,476	41,285	42,111	42,953	43,812
Arena (annual - 2.4 persons / car)		59,167	59,167	59,167	60,350	61,557	62,788	64,044	65,325	66,631	67,964	69,323	70,710	72,124	73,566	75,038
Fee Schedule																
Monthly	$30.00	30.90	32.14	33.42	34.76	36.15	37.59	39.10	40.66	42.29	43.98	45.74	47.57	49.47	51.45	53.51
Daily Maximum (daytime)	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Daily Maximum (evening)	$3.00	3.09	3.21	3.34	3.48	3.61	3.76	3.91	4.07	4.23	4.40	4.57	4.76	4.95	5.15	5.35
Hourly	$1.00	1.03	1.07	1.11	1.16	1.20	1.25	1.30	1.36	1.41	1.47	1.52	1.59	1.65	1.72	1.78
Theater Events	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Arena Events	$4.00	4.12	4.28	4.46	4.63	4.82	5.01	5.21	5.42	5.64	5.86	6.10	6.34	6.60	6.86	7.13
Gross Revenue (Annual)																
Employee, monthly		22,248	27,766	32,085	34,035	36,105	38,300	40,628	43,099	45,719	48,499	51,448	54,576	57,894	61,414	65,148
Conv Ctr Visitors/Daytime (annual)		176,376	220,117	254,358	269,823	286,228	303,630	322,091	341,674	362,448	384,485	407,862	432,660	458,965	486,870	516,472
Conv Ctr Visitors/Evening (annual)		56,146	70,070	80,969	85,892	91,115	96,654	102,531	108,765	115,378	122,393	129,834	137,728	146,102	154,985	164,408
Visitor, hourly (peak hour)		31,364	39,142	45,230	47,980	50,898	53,992	57,275	60,757	64,451	68,370	72,527	76,936	81,614	86,576	91,840
Theater (annual)		142,327	148,020	153,941	163,301	173,229	183,762	194,935	206,787	219,359	232,696	246,844	261,852	277,773	294,662	312,577
Arena (annual)		243,767	253,517	263,658	279,688	296,693	314,732	333,868	354,167	375,701	398,543	422,775	448,480	475,747	504,672	535,357
Total		672,227	758,632	830,241	880,720	934,268	991,071	1,051,328	1,115,249	1,183,056	1,254,986	1,331,289	1,412,232	1,498,095	1,589,179	1,685,802
M&O Expenses	$400	397,992	413,912	430,468	447,687	465,594	484,218	503,587	523,730	544,680	566,467	589,125	612,690	637,198	662,686	689,193
Net Operating Revenue		274,235	344,720	399,773	433,033	468,673	506,853	547,741	591,519	638,377	688,519	742,164	799,541	860,897	926,493	996,608
Debt Service																
$10,765 per space **5.5%** interest **30** years		715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507
Net Operating Income		(441,272)	(370,786)	(315,733)	(282,474)	(246,833)	(208,654)	(167,765)	(123,988)	(77,130)	(26,987)	26,657	84,035	145,391	210,987	281,102
Debt Serice Coverage		0.38	0.48	0.56	0.61	0.66	0.71	0.77	0.83	0.89	0.96	1.04	1.12	1.20	1.29	1.39
Accumulated Balance		(441,272)	(812,058)	(1,127,791)	(1,410,265)	(1,657,098)	(1,865,752)	(2,033,517)	(2,157,505)	(2,234,635)	(2,261,622)	(2,234,965)	(2,150,930)	(2,005,539)	(1,794,553)	(1,513,451)

Table 6.6 continued
Financial Proforma for Convention Center Attendees/Exhibitors
AVERAGE ATTENDANCE

	Fiscal Year														
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Escalation of Fees	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Escalation of M&O	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Growth in Parking Demand	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Daily Parkers in Garage															
Employee, monthly	103	106	108	110	112	114	117	119	121	124	126	129	131	134	137
Conv Ctr Visitors/Daytime (annual)	73,839	75,315	76,822	78,358	79,925	81,524	83,154	84,817	86,514	88,244	90,009	91,809	93,645	95,518	97,428
Conv Ctr Visitors/Evening (annual)	31,340	31,967	32,606	33,258	33,923	34,602	35,294	36,000	36,720	37,454	38,203	38,967	39,747	40,542	41,352
Visitor, hourly (peak hour)	129	132	135	137	140	143	146	149	152	155	158	161	164	167	171
Theater (annual - 2.2 persons / car)	44,688	45,582	46,494	47,424	48,372	49,339	50,326	51,333	52,359	53,407	54,475	55,564	56,675	57,809	58,965
Arena (annual - 2.4 persons / car)	76,538	78,069	79,631	81,223	82,848	84,505	86,195	87,919	89,677	91,470	93,300	95,166	97,069	99,011	100,991
Fee Schedule															
Monthly	55.65	57.88	60.19	62.60	65.10	67.71	70.41	73.23	76.16	79.21	82.37	85.67	89.10	92.66	96.37
Daily Maximum (daytime)	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Daily Maximum (evening)	5.56	5.79	6.02	6.26	6.51	6.77	7.04	7.32	7.62	7.92	8.24	8.57	8.91	9.27	9.64
Hourly	1.85	1.93	2.01	2.09	2.17	2.26	2.35	2.44	2.54	2.64	2.75	2.86	2.97	3.09	3.21
Theater Events	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Arena Events	7.42	7.72	8.03	8.35	8.68	9.03	9.39	9.76	10.15	10.56	10.98	11.42	11.88	12.35	12.85
Gross Revenue (Annual)															
Employee, monthly	69,109	73,310	77,768	82,496	87,512	92,832	98,477	104,464	110,815	117,553	124,700	132,282	140,325	148,856	157,907
Conv Ctr Visitors/Daytime (annual)	547,874	581,184	616,520	654,005	693,768	735,950	780,695	828,161	878,514	931,927	988,589	1,048,695	1,112,455	1,180,093	1,251,842
Conv Ctr Visitors/Evening (annual)	174,404	185,008	196,256	208,189	220,847	234,274	248,518	263,628	279,657	296,660	314,697	333,830	354,127	375,658	398,498
Visitor, hourly (peak hour)	97,424	103,347	109,631	116,296	123,367	130,868	138,825	147,265	156,219	165,717	175,793	186,481	197,819	209,846	222,605
Theater (annual)	331,582	351,742	373,128	395,814	419,879	445,408	472,489	501,216	531,690	564,017	598,309	634,686	673,275	714,210	757,634
C	567,906	602,435	639,063	677,918	719,135	762,859	809,241	858,443	910,636	966,002	1,024,735	1,087,039	1,153,131	1,223,242	1,297,615
Total	1,788,298	1,897,027	2,012,366	2,134,718	2,264,509	2,402,191	2,548,244	2,703,177	2,867,530	3,041,876	3,226,822	3,423,013	3,631,132	3,851,905	4,086,101
M&O Expenses	716,761	745,432	775,249	806,259	838,509	872,049	906,931	943,209	980,937	1,020,175	1,060,982	1,103,421	1,147,558	1,193,460	1,241,198
Net Operating Revenue	1,071,537	1,151,595	1,237,117	1,328,459	1,426,000	1,530,141	1,641,313	1,759,969	1,886,593	2,021,702	2,165,841	2,319,592	2,483,575	2,658,445	2,844,903
Debt Service															
$10,765	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507	715,507
5.5%															
30															
Net Operating Income	356,031	436,089	521,611	612,953	710,493	814,635	925,806	1,044,462	1,171,087	1,306,195	1,450,334	1,604,086	1,768,068	1,942,939	2,129,396
Debt Serice Coverage	1.50	1.61	1.73	1.86	1.99	2.14	2.29	2.46	2.64	2.83	3.03	3.24	3.47	3.72	3.98
Accumulated Balance	(1,157,420)	(721,332)	(199,721)	413,231	1,123,724	1,938,359	2,864,165	3,908,627	5,079,714	6,385,909	7,836,244	9,440,329	11,208,398	13,151,336	15,280,733

Parking Division Benefits

One of the immediate steps the City can take is to form a separate entity that can manage, enforce and continually monitor the downtown parking situation. Aside from simply enforcing rules and regulations related to parking (i.e. giving citations and collecting fines), the Baton Rouge Parking Division should have the technical capability to understand parking needs by locality, have the funding to initiate parking-related infrastructure changes, and have the authority to implement progressive parking management strategies.

The Parking Division should be part of or have a strong relationship with a larger City department that understands downtown's sustainability, such as the Planning or Economic Development departments. Rather than narrowly focusing on parking enforcement as an end-goal, the division should have a clear mandate to manage parking as an asset to support existing and future redevelopment.

The Parking Division should maintain regular communication with the Downtown Development District (DDD), merchants, property owners, and other city departments to be regularly informed of the community's goals and expectations. Representatives of key stakeholders can form an oversight committee for the Parking Division who will continuously monitor its activities and set future expectations. In terms of enforcement of parking regulations, the division needs to be supported by the police department, the planning code enforcement division and other relevant city departments. Appropriate coordination is most essential with the police department during the onset of the division's operation.

The parking division is envisioned to further the goals of this study through the following tasks:

- Maintain and update the parking facilities supply and demand data gathered through this study;
- Initiate and manage any parking management policies and strategies, including the establishment of more effective enforcement programs (i.e. revising fine structures or providing incentives);

- Monitor effectiveness of parking strategies and improve these as necessary;
- Manage new and existing public parking;
- Coordinate management of private parking lots;
- Coordinate and negotiate with private sector regarding joint-use agreements; and
- Oversee infrastructure changes related to parking (roadway rebuilding/re-striping, construction of garages, way-finding program).

Findings

The findings of the pro forma analysis are not unexpected and there are two primary reasons for this:

- The parking rates are very low, especially for monthly and hourly parkers;
- It is very unusual for a parking structure to be self-supporting without a high percentage of short-term parkers.

Given the analysis and findings of this study it is evident that the City will need to subsidize the cost of providing the new parking structure. However, there may be other options available to the City that were not fully evaluated in the scope of this report. Some of those strategies are discussed below.

Short-term, hourly parking generates far higher revenue per space than monthly or special event parkers and are critical component of the overall revenue generation. The City of Baton Rouge will need to subsidize the parking structure over the term of the financing. There are several ways in which this may be possible:

- Reduce the size of the garage so that it can be expanded in a second phase (if feasible);
- Raise the parking rates at a faster rate than 4 percent per year;
- Dedicate city-wide system parking revenues towards the debt service;
- Dedicate city-wide parking fines and permits revenue towards the debt service;
- Create a parking special assessment area to pass the costs to the generators of the parking demand;

- Enter into a public/private partnership that will provide an opportunity for a sale-leaseback arrangement or developer financed project that will limit the exposure of the City; or
- Create a mixed-use component of the project that would be controlled by the City. Market rate lease, rental or condominium space typically provides higher revenue per square foot than parking can.

There may be other strategies that can reduce the cost to City that can be evaluated in more detailed analysis at the City's request.

APPENDIX

Coordinated Intermodal Transportation Pricing and Funding Strategies

Transportation Cooperative Research Program
October 1997

Transit Cooperative Research Program
Sponsored by the Federal Transit Administration
RESEARCH RESULTS DIGEST
October 1997--Number 14

Subject Area: VI Public Transit Responsible Senior Program Officer: Stephen J. Andrle

Coordinated Intermodal Transportation Pricing and Funding Strategies

This TCRP digest provides a summary of TCRP Project H-6, "Transit Fare Pricing Strategy in Regional Intermodal Transportation Systems," conducted by Multisystems, Inc., in collaboration with Apogee Research, Inc., and Oram Associates. Included in the digest are (1) a summary of the key issues and study findings, and (2) several technical appendixes providing key background information.

INTRODUCTION

This digest will be of interest to transportation officials and planners considering coordinated pricing issues.

Transit agencies are looking for innovative strategies to address the gap between costs and revenues. Coordinated intermodal pricing is an approach that has the potential to generate new revenues, increase transit ridership, and help achieve regional transportation goals. It means setting the level of transit fares, parking rates, and tolls in order to achieve larger metropolitan area goals with respect to mobility, air quality, and congestion mitigation. This integrated approach, however, is not often considered. Transit Cooperative Research Program (TCRP) Project H-6, *Transit Fare Pricing Strategy in Regional Intermodal Transportation Systems,* was designed to (1) examine factors that influence the ability to coordinate transportation pricing and funding strategies in a regional intermodal context and (2) develop a conceptual approach for pursuing such coordination.

This project presents a framework for transit agencies and their partners to use in developing a coordinated intermodal pricing strategy. While it is not feasible to present a detailed set of "how-to" instructions for introducing coordinated regional pricing in all settings, the TCRP Project H-6 final report is designed to raise awareness and foster consideration of these issues among policymakers and planners and to provide them with a set of guidelines for developing their own plans and strategies. This digest summarizes the approach and findings presented in the final report and also includes, as appendixes, technical background materials that will be of interest to transportation officials and planners considering coordinated pricing issues. Copies of the final report are available through the TCRP, 2101 Constitution Avenue, N.W., Washington, DC 20418.

THE CASE FOR COORDINATED INTERMODAL PRICING

Transit agencies across the United States are facing funding shortfalls with increasing regularity. Increasing costs can be attributed, in part, to the labor- and capital-intensive nature of the transit industry. Reduced ridership and revenue are attributable largely to the suburbanization of jobs and residences and to the convenience of auto travel in the suburbs. These combined factors result in a funding shortfall. At the same time, transit agencies are struggling to comply with such federal requirements as the Americans with Disabilities Act and the Clean Air Act (CAA). The burden of capital expenditures continues to increase

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because equipment and infrastructure require periodic replacement and because systems must expand services in response to changing demographics and legislative requirements. Transit serves a range of public policy and social goals. Transit represents an alternative to automobile travel that can reduce traffic congestion and the resulting air pollution; in addition, transit can encourage economic development and improve mobility for those who are not able to drive because of age, disability, or economic hardship, and for those who prefer not to drive.

Unfortunately, traditional sources of funding are not keeping pace with these growing needs. Overall federal operating assistance has declined consistently since the early 1980s, and even greater reductions appear imminent. Although state and local governments have filled much of this funding gap over the last 15 years, their willingness and ability to continue funding transit at current levels is less certain.

In light of these trends, it is increasingly urgent for transit agencies to find new and effective ways to close the cost/revenue gap. Some agencies have explored the use of innovative funding practices, many of which attempt to capitalize on the relationship between transit and new land development. Typically, however, these strategies do not effectively address the role that a transit system plays in a coordinated regional transportation system. In fact, coordinated intermodal planning has been uncommon, and pricing decisions seldom directly address factors related to multiple modes. Nor do transit decisionmakers seem to take into account the potential effects of their fares on the attractiveness of other modes of travel and their interaction with regional transportation and economic goals. This lack of consideration of the broader transportation context can result in inconsistent public policies; for instance, a transit fare increase (and the resultant ridership loss) tends to work against efforts to reduce traffic congestion or improve air quality.

In contrast, coordination of transit pricing with pricing decisions concerning the single-occupant vehicle (SOV) offers the potential to address both the financial goals of the transit agency and the overall transportation goals of the region. Integrating transit pricing decisions into a broader regional context might assume two basic forms:

< In making pricing decisions, the transit agency considers not only its own internal factors (ridership and revenue trends, fare elasticities, etc.) as well as external economic factors (employment rates, retail sales, etc.), but also price changes in competing modes. For instance, the transit agency may decide to time a planned fare increase so that it coincides with a toll increase or other introduction of congestion pricing in a major corridor. The underlying reasoning might be that the toll increase or congestion pricing will minimize if not completely offset the ridership loss that might normally accompany a fare increase.

< The transit agency or other regional agency seeks to influence one or more other modal agencies in the region to increase auto-related pricing and possibly provide a cross-subsidy to transit. The transit agency might then make its pricing decisions based on the nature of the auto-related pricing measure (such as congestion pricing or a parking fee), and whether or not there will be any cross-subsidy. The rationale here might be that because transit plays an important role in addressing regional transportation goals, its pricing might be coordinated with that of other modes.

Federal policy of the last few years has emphasized intermodal planning and air quality improvement particularly as driven by the Intermodal Surface Transportation Efficiency Act of 1990 (ISTEA) and CAA legislation. These developments encourage transit pricing strategies that are coordinated with regional intermodal transportation policies and initiatives. Transit service may be a key element in efforts to address regional transportation and environmental challenges effectively. A technique for implementing this type of intermodal transportation strategy might be for transit agencies to approach local, regional, or state agencies with a proposal to integrate transit pricing into the regional (and ultimately national) transportation pricing/subsidy decisionmaking process. A successful strategy might begin to alleviate the joint problems of growing transit costs and declining revenues by establishing new transit funding streams and by "leveling the playing field" in subsidizing transit and auto travel.

ISSUES RELATED TO COORDINATED PRICING

Transit is one element in a complex system that includes multiple modes of transportation, land use patterns, and economic activity. An individual's decision to use transit is based on a number of factors, including the costs and benefits (such as travel time) of alternative modes. Thus, in order to assess more accurately the influences on and effects of transit pricing, it is important to take a broader view of the entire regional, intermodal transportation system. Key issues and concerns related to intermodal pricing can be summarized as follows.

Regional and Transit Agency Goals

Regional agencies tend to set goals that address multijurisdictional and multimodal themes. Although these goals vary with the region and the specific agency, they may typically deal with three general, interrelated themes:

< Reducing vehicle miles traveled (VMT) and use of SOVs;
< Maintaining regional access and mobility; and
< Supporting economic development.

Transit agencies, on the other hand, may set goals that conflict with the above regional themes. While transit agencies may strive to maintain a simplified fare structure or to ensure equity, their major goals in modifying their fare structures are invariably one or both of the following: increasing ridership and increasing revenue.

The pricing of public transit in the United States has traditionally been based on the desire to balance these two goals. Transit pricing decisions focus on analyses of the effects of fare changes on ridership and revenues, coupled with evaluations of other related criteria (e.g., equity, affordability, convenience). These evaluations, however, seldom examine factors beyond the transit system itself. The role of transit in the overall transportation system suggests the need to add the regional, intermodal effects of a change in transit fare or of a change in the price of other transportation modes to the list of concerns in the pricing of transit and other transportation services. Considering transit pricing in a regional context may expand the range of potential actions that support the policy goals of transit and other transportation agencies alike.

Transportation Costs and the Influence of Price on Mode Choice

Transportation costs have three major components:

< *Variable out-of-pocket costs,* which include fuel prices and taxes, auto maintenance and repair, tolls, transit fares, and user-paid parking fees;

< *Fixed out-of-pocket costs,* which include the price of a vehicle, licensing and registration fees, and basic insurance costs; and

< *Societal costs and externalities,* which may include the costs of road construction and maintenance, transit capital expansion, traffic enforcement, accident response, and mitigating air and noise pollution.

Even within the expenses that they pay out-of-pocket, auto users typically consider only *variable out-of-pocket costs* such as fuel, parking, and tolls in their daily modal decision. This means that, for the commuter who has free parking and no tolls, even a transit fare of $1.00 or less may seem higher than the daily cost of an auto trip. While it is unlikely that transit pricing alone can influence mode choice, considering transit fares in a larger regional transportation context that takes into account the range of factors influencing mode choice might promote transit as a competitive option.

To understand how changes in the price of each mode affect the choice of mode, there are two basic questions:

< How much does demand for a mode change, given a change in its price?

< As the price of one mode changes, how much of the demand shifts to or from competing modes?

Although the effects can be difficult to quantify, available information indicates that changes in auto-related costs-especially parking fees may significantly influence demand for high-occupancy vehicles (HOV), including transit. Although the effect is smaller, changes in transit fares may also affect SOV use. For example, (1) an increase in transit ridership, as a result of increased parking and roadway costs, may reduce traffic congestion and pollution and (2) an increase in transit fares may lead to more SOV driving, resulting in more congestion and pollution.

The magnitude of these effects will vary with the characteristics of local transportation systems, but these relationships represent key principles underlying the pursuit of intermodal pricing. Thus, in attempting to encourage transit usage, thereby reducing VMT and congestion, a key challenge is to coordinate pricing decisions so as to minimize fare increases.

Integrated Transit Pricing and Transit Fare Subsidies

In considering potential intermodal coordination strategies, it is instructive to review the issues and experiences of transit agencies that have sought to coordinate different operators' pricing efforts. Reviewing the issues associated with developing a coordinated *transit pricing program* can illustrate some of the institutional issues involved with a coordinated *intermodal pricing strategy.* Developing regional fare integration is an ambitious undertaking. It is difficult to determine a mutually acceptable fare structure or fare payment technology as well as a revenue allocation/distribution system for technical and financial reasons, and there will be significant differences in managerial approaches among participating agencies. The difficulties associated with developing agreements within these different *transit institutional settings* suggest the types of challenges in developing *intermodal agreements.*

In considering the pricing of different modes, it is important to keep in mind that the official or stated cost (e.g., fare level or parking charge) is not the most important price related factor affecting mode choice and level of usage. Rather, the perceived cost what the traveler actually has to pay is the key factor. Out-of-pocket costs are both variable and fixed and can differ considerably from the full cost. Part of this differential is attributable to user subsidies (typically from employers) that cover much, if not all, of the actual parking price. Many employers do subsidize transit usage to some extent, and these subsidy programs are important to consider in reviewing transit pricing elements for two reasons: (1) they help equalize the effects of free or heavily discounted parking and (2) they can be used to offset the effects of a fare increase on certain travelers. In fact, it has been shown that the availability of a transit subsidy is more important in increasing ridership than the amount of that subsidy. (Appendix A contains a summary of the research on transportation costs and pricing issues and a list of references, and Appendix B presents several examples of

integrated transit pricing and subsidy programs in the United States.)

Distribution of Revenues

One of the key premises in this project is that the revenues raised by increasing auto pricing, particularly through tolls or congestion pricing, may conceivably be used to cross-subsidize transit. In addition to the obvious benefits to transit, using auto-related revenues in this way may help achieve public support for the potentially unpopular notion of congestion pricing. However, there are a number of alternatives for distributing revenues from auto-related pricing strategies, including reinvestment in highway programs, program administration costs, mitigationprograms (including additional transit service), and compensation to affected parties such as merchants, low-income drivers, or local governments. Developing these agreements is clearly a crucial aspect of any intermodal coordination effort.

Implementation of Transit Pricing Changes and Current Coordinated Intermodal Pricing Practices

In considering the potential for regional intermodal pricing strategies, it is important to understand how transit agencies set fare policy and make fare-related decisions. This process may differ widely, depending on such factors as institutional setting, regulatory restrictions or requirements, and the general decisionmaking structure. Most transit agencies require a combination of board approval and public hearings to introduce new fare levels, but some agencies must also receive approval from legislative and judicial bodies. While intermodal and inter-operator coordination efforts involve a different set of issues, any strategy requiring a transit fare change will ultimately face comparable institutional requirements.

With regard to coordinated pricing, there are few examples of coordinated pricing involving transit and auto-related functions in the United States. In Portland, Oregon, and Bellevue, Washington, transit agencies and highway or parking agencies have cooperated to enhance the appeal of transit by improving transit service quality, but not by altering pricing mechanisms. Bellevue city planners sought to have the Seattle area transit agency expand bus service in proportion to increases in the city's employment density. Coordinated pricing has typically been considered impractical or infeasible when it is considered at all. Even those agencies that internally control the prices of both transit and auto travel have been unwilling to use this authority to pursue coordinated regional pricing and have tried to downplay the cross-subsidy connection.

CONCEPTUAL APPROACH TO INTERMODAL PRICING

Because of the interrelationships among the various factors that determine mode choice and travel behavior, coupled with the role that transit plays in supporting regional transportation goals, transit agencies may seek to coordinate their own pricing decisions with those that affect other modes. This project developed a conceptual approach to intermodal pricing to provide guidelines that planners and decisionmakers can adapt to their own circumstances as they make pricing decisions. The key elements of this approach can be summarized as follows.

Development of Coordinated Pricing Strategies

The approach described here involves (1) identifying transit and regional transportation goals, alternative pricing actions and strategies to consider, and stakeholders that will be affected by any pricing strategy; (2) evaluating alternative strategies and their associated institutional requirements and responsibilities; and (3) preparing an implementation plan. The interrelationships among the different steps and elements are depicted graphically in Figure 1.

The pricing actions to be considered might include changes to the following:

- Transit fares;
- Auto-related prices (e.g., increase or institute tolls, eliminate free parking);
- Cross-subsidies (e.g., from auto-related to transit-oriented); and
- Transit user subsidies (e.g., employer provided transit vouchers and pass subsidies, or human service agency client-transit subsidies).

Coordinated pricing strategies may consist of combinations of actions. The appropriate strategy in a region will depend on several factors, including the specific goals being pursued, the expected effects on the various stakeholders, and the nature of the institutional requirements and barriers. In general, however, there are four basic types of strategies envisioned:

- The transit agency raises fares without any concomitant change in auto-related pricing; this will address the transit agency's goal of increasing revenue, but will undermine the overall regional goals related to reducing VMT.
- The transit agency raises fares with an accompanying auto-related charge (i.e., congestion pricing or some type of parking fee); this will generate fare revenue and will offset, at least to some extent, the fare increase in terms of the shift from transit to SOV usage.
- The transit agency proposes a fare increase, but agrees not to increase fares because an intermodal arrangement establishes an auto-related charge coupled with a cross-subsidy to transit; this arrangement would produce the needed revenue for the transit agency, while avoiding a fare increase and the resulting increase in SOV mode share.
- A local, regional, or state implements an auto-related pricing action and offers the transit agency a cross-subsidy in return for a reduction in transit fares; this would maximize the reduction in SOV use and, therefore, would best address regional transportation goals.

The first of these strategies represents current industry practice; while there is no direct coordination involved, the transit agency can make its fare decisions in consideration of other pricing actions. The other three strategies represent varying degrees of intermodal coordination. Thus, intermodal pricing strategies fall into two categories: (1) the transit agency initiated strategy designed to meet its revenue needs and (2) the nontransit agency initiated strategy designed to reduce SOVs. Figure 2 shows the process involved in developing the alternative strategies.

Institutional Requirements and Barriers

While there are cogent reasons for integrating transit pricing into the regional intermodal context, it is important to remember that there are barriers to achieving the kinds of coordination described here. Resistance to price increases in any mode, coupled with general barriers to interagency cooperation, may make coordinated intermodal pricing difficult to achieve. Attempting to institute auto-related pricing by itself has proven a formidable task in most locations; this is evidenced by the delays in the actual implementation of U.S. congestion pricing demonstrations to date. Similarly, it may be difficult to impose areawide parking charges or restrictions. Cross-subsidy programs, although they create a direct link between the problem (traffic congestion and auto-relatedemissions) and a potentially key part of the solution (transit), may not obtain sufficient support from the public and local officials.

Understanding institutional and organizational requirements and barriers is critical to developing an effective strategy. Responsibilities for initiation, implementation, and administration of the coordinated effort must be clearly assigned. Furthermore, policies and regulations, as well as review and approval procedures, must be established. Where there is a cross-subsidy arrangement, an interagency revenue transfer agreement must be developed. Regardless of the local situation, there will likely be significant institutional requirements to be addressed.

One agency should take the lead in coordinating an intermodal pricing strategy, identifying separate but complementary roles for the key entities involved in the process. Potential candidates for a lead agency include state DOTs or highway departments, regional planning or transportation agencies, city or county governments, and specialpurpose local governments or metropolitan districts. Each type of agency has advantages and disadvantages; the appropriate agency will differ from one location to the next, depending on the specific strategy being developed and the specific characteristics and capabilities of the candidate agencies in a region. In evaluating alternative strategies, it is necessary to consider the overall institutional feasibility of the strategies and the expected effects on various stakeholders, as well as the extent to which each strategy addresses the key goals of the coordination effort. The consideration of institutional issues and their effects is envisioned as taking place in an iterative fashion. In some cases, though, agencies will choose to evaluate strategies based only on their apparent institutional feasibility before considering the effects, whereas in other cases, agencies will undertake detailed quantitative assessments of ridership and revenue effects before addressing the institutional issues. However, the general approach outlined in this digest may prove useful in at least initiating the consideration of coordinated intermodal pricing. (Appendix C describes a methodology that may be used in assessing potential ridership and revenue effects in applying the intermodal pricing coordination approach developed in this project.)

In summary, pursuing a coordinated intermodal pricing strategy may achieve a wide range of public policy goals. In addition to providing regional agencies with new tools to address concerns about traffic congestion and air quality, an integrated planning process may help ensure that public policy is consistent across agency lines and may forge new partnerships among related agencies. With the current emphasis on intermodal coordination, transit agencies may become active players in larger transportation policy arenas and, to the extent that they generate new revenues for transit agencies, coordinated pricing strategies may help address the growing gap between transit costs and funding streams.

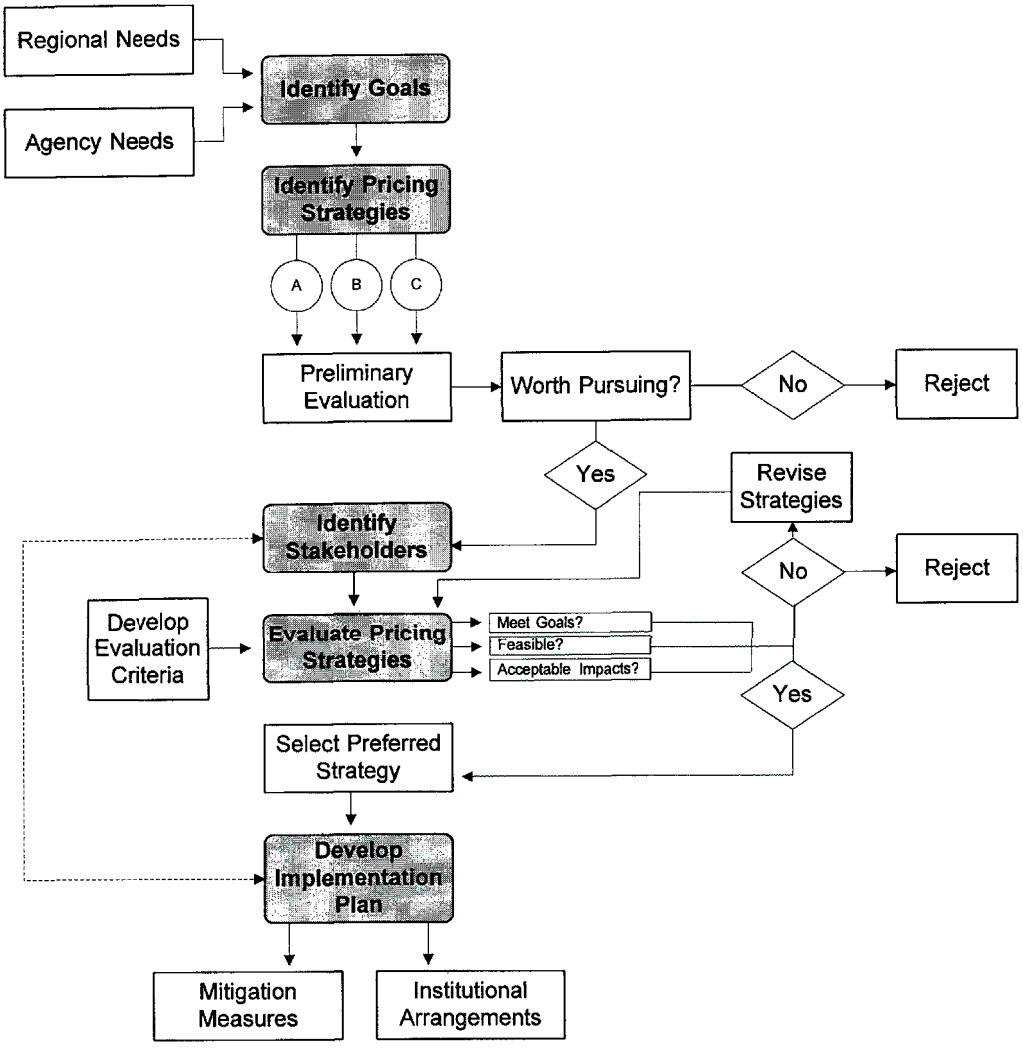

Figure 1. Coordinated pricing process.

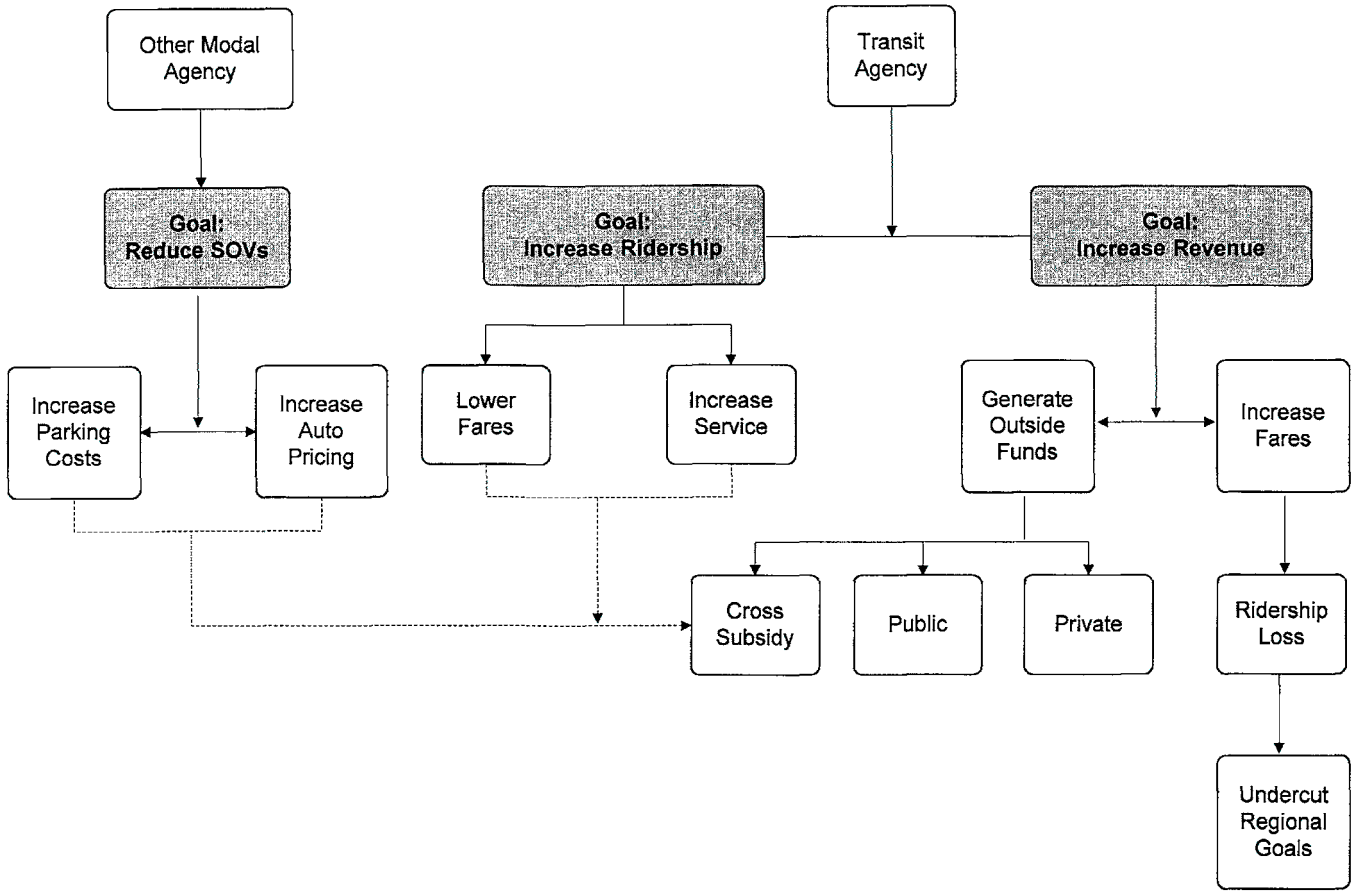

Figure 2. Definition of alternative scenarios.

APPENDIX A

SUMMARY OF RESEARCH ON TRANSPORTATION COSTS AND PRICING ISSUES

This appendix presents detailed findings of the literature review on transportation cost and mode choice issues, along with the list of references.

A.1 PRICING DISTORTIONS AND THE COSTS OF AUTOMOBILE TRAVEL

The economic ideal in the pricing of a good or service is to set the price of the product at a level that equals the marginal cost of its consumption. For automobile travel, this means that motorists should pay not just their own costs of owning and operating the vehicles, but also the added costs of increased traffic delays and air pollution that their cars' use imposes on others. The typical driver in an urban area bears only a fraction of these "societal" costs. The unpublished interim report from TCRP Project H-3, *Policy Options to Attract Auto Users to Public Transportation,* (Portland State 1994) cites the results of three studies (Meyer, in Johnson 1993; MacKenzie et al. 1992; and Hanson 1992) that computed the extent to which auto drivers are subsidized. These studies estimate that one-half to three-quarters of the total costs of driving are essentially borne by others. Apogee Research (1994) estimated a higher percentage borne by users (on the order of 80%), but this was for peak periods only and represented only a single city (Boston). The assumptions used in deriving such figures clearly affect the outcome. For example, in contrast to the studies cited above, the Highway Users Federation estimates that motorists pay for virtually all costs of highway infrastructure (Beshers, 1994).

Pucher (1995) summarizes estimates of direct and indirect subsidies to automobiles and trucks in the United States. These estimates range from $378 billion to $935 billion per year, with an average of $635 billion. Subsidies include explicit subsidies to roadway construction and maintenance, indirect subsidies in the form of free parking, and hidden subsidies resulting from the costs of congestion, air pollution, noise, and accidents. To put these subsidies in perspective, Pucher estimates that they are roughly one thousand times greater than total federal operating assistance to transit.

Consequences of this underpricing are greater automobile use, a misallocation of resources to auto travel, and, indirectly, pressure to keep transit fares at a commensurately low level (i.e., below the full cost of transit operations). This distortion has had the unintended consequence of encouraging urban sprawl and has led to the often severe traffic congestion characterizing many roadways today.

The costs of driving can be grouped into three categories:

< Out-of-pocket variable costs,
< Out-of-pocket fixed costs, and
< Societal costs and externalities.

Variable costs include fuel prices and taxes, auto maintenance and repair, tolls, and user paid parking fees. A portion of auto insurance costs can also be variable, for example, higher rates for "commuter cars." Variable costs shape modal choices in conjunction with considerations of comfort, convenience, trip time, and transit characteristics.

Fixed costs include not only the price of a vehicle but also licensing and registration fees, which do not vary by VMT, and basic insurance costs. Fixed costs, acting in conjunction with income and even with transit availability and convenience, affect the decision to own a vehicle and hence the transportation choices available--nonowners "choose" transit or HOV travel by default.

Societal costs and externalities are borne by society in general. Subsidization occurs when the individual auto users do not directly bear these costs in proportion to their responsibility. Information on societal costs and externalities allows better understanding of the total resources consumed by the transportation modes within the region. In a proactive context, this understanding feeds into strategic planning which, in turn, can lead to internalization of these costs through policies such as transportation management or translation into out-of-pocket costs through fuel taxes, smog-certification fees and VMT taxes.

Collectively, the literature reviewed for the study addressed all three types of cost. Some studies evaluated the full range of costs whereas others focused on one or two aspects. A number of cost-oriented studies also evaluated transit characteristics. Selected studies explicitly explored the linkages between specific costs and traveler behavior; fewer studies documented the strength of such linkages with empirical data that demonstrate the behavioral implications of changes in driving costs.

Variable Out-of-Pocket Costs

The greater emphasis in direct cost analyses is on variable costs because these are the focus of most policy suggestions. This is appropriate because of all the costs, the traveler is most aware of what he or she pays out-of-pocket. For the auto driver, these are the costs for parking and perhaps for tolls. The motorist might also attribute to the trip some of the cost of gasoline consumed, and perhaps some perception of the value of the time spent on the road and in traffic delays. While the true cost of the trip also includes a portion of the fixed costs associated with owning an auto (purchase or lease price, insurance, and maintenance), the typical driver seldom considers these "sunk" costs in making daily travel decisions. It is against parking charges and tolls (and occasionally fixed costs) that transit competes. Except for special occasions (e.g., the car is in the shop), a traveler who could take a trip by car will only go by transit when he or she perceives the trip-related net costs for the car to significantly exceed the costs for using transit.

A number of studies document the level of individual costs; for example,

Apogee Research (1994) identifies the full range of transportation costs for all modes, establishes an analytical framework, and quantifies out-of-pocket and societal costs of transportation modes based on case studies in Boston, Massachusetts, and in Portland, Maine. Several studies move beyond documentation with policy prescriptions to alter travel behavior by manipulation of variable costs. MacKenzie, Dower, and Chen (1992) consider the full range of automobile costs-external and public capital costs, as well as variable and fixed costs and conclude with recommendations for increased fuel, truck, parking, and toll-road taxes to constrain SOV demand. For example, they note that even with a $2 per gallon increase in fuel taxes, U.S. gasoline prices would be significantly below those of most other industrialized nations; equity considerations could be addressed with income tax rebates.

A number of studies address congestion pricing, which reduces congestion on selected roadways by increasing variable costs in relation to traffic volume. These studies, more than others, focus on the behavioral aspects of increased travel costs. All tolls both "flat" tolls and congestion pricing--increase the variable dollar costs of SOV travel. However, under most current proposals these tolls are not assessed across-the-board for all SOV trips (i.e., they propose limited application rather than complete areawide electronic tolling). The effects on transit use may be limited if, for example, pricing on one road leads primarily to a shift in routes rather than to a shift in mode. These studies, which address the influence of price of individual modes on the use of transit and other modes, are described in Section A.2.

Fixed Out-of-Pocket Costs

None of the studies reviewed were confined to fixed costs of driving. Apogee Research (1994) and Litman (1995), however, cite data drawn from other studies that include fixed costs as well as variable and social costs. Litman presents several tables that disaggregate the costs of auto ownership by type of car. He also translates vehicle ownership costs into dollars per vehicle mile, by type of vehicle. For example, his best guess is $0.206 per vehicle mile for an average car, $0.181 for a fuel efficient car, $0.258 for an electric car, and $0.268 for a van. These are approximate sums of the Federal Highway Administration's estimates (presented in Table A-1).

Apogee Research's study estimated a $0.201 cost per passenger mile for depreciation/financing, $0.076 to $0.121 per passenger mile for insurance, and $0.013 per passenger mile for registration/licensing for SOV travel on both expressways and non-expressways in Boston. For Portland, the range was narrower for insurance (a high of $0.94 per passenger mile), registration was $0.001 less, and depreciation was the same.

Societal Costs and Externalities

The need for individual travelers to begin to pay for their trip's societal costs and negative externalities provides the basic rationale for congestion pricing, higher fuel taxes, and parking fees.

Distinct from studies of congestion pricing and other prescriptive recommendations using externalities as justification, several studies focused more on evaluation and estimation of the underlying externalities themselves. Apogee Research (1994) quantified many of these costs and presented them in an extensive table of costs per passenger mile traveled. For example, total cost ranged from $0.713 to $1.050 for peak period SOV travel in Boston, of which $0.563 to $0.880 were borne by the users themselves and the rest was borne by government or society at large. Costs were higher for non-expressway SOV travel. The study also presented costs for HOV and several transit modes.

Similar to Apogee Research's study, Litman (1995) addresses a wide range of external and social costs as well as user costs for transportation. For example, he summarizes water pollution costs from water runoff effects, road salting, and oil spills, and translates these into costs per vehicle mile by type of vehicle. He suggests water pollution costs, external to the vehicle user, of $0.013 per vehicle mile for average and fuel-efficient cars, vans, diesel buses, and motorcycles, and water pollution costs of $0.07 per vehicle mile for electric cars. The Federal Railroad Administration (1993) similarly addressed social costs such as land use, community disruption, energy consumption, safety, and congestion as well as air, noise, and water pollution effects.

MacKenzie et al. (1992) discussed strategic social costs such as dependence on foreign oil supply as well as noise, pollution, congestion, accidents, and vibration and presents estimates of costs drawn from other studies. For example, MacKenzie cites a paper by Ketcham that estimated the national loss in property value (mostly along local streets) due to vibration as about $6.6 billion in 1989, primarily due to heavy vehicles. MacKenzie also cites two studies addressing noise that place the loss per home-property unit in the range of $6 to as much as $182 per decibel of excess noise.

Regarding the application of cost information, Nelson and Shakow (1995) have developed a prototype computer model applying total cost analysis to transportation planning for the Puget Sound metropolitan region. This model compares the total costs of options related to implementation of several projects to increase capacity (e.g., light rail, commuter rail, a bicycle/pedestrian network, and highway construction) and options emphasizing public and private incentives to reduce use of SOVs (e.g., employer-subsidized parking cash-out, congestion pricing, and telecommuting tax incentives). The model also includes the capacity to account for the political environment by forcing one or more options into the final mix or by ensuring that the final mix is "balanced" in some manner, such as between transit and highway improvements. This model indicates that the use of total cost analysis is a

TABLE A-1 Fixed costs to the user for vehicle ownership (in cents per mile based on average usage)

Vehicle	Depreciation	Insurance	Finance Charges	License and Registration
Sub-compact car	8.6	7.1	1.6	0.8
Average car	10.7	7.0	2.0	0.9
Van	14.2	8.5	2.9	1.2
Electric car	15.1	7.1	2.8	0.8

feasible method of analyzing investment and pricing decisions, although the authors point out that the model is in need of considerable improvement before it can be used as an operational tool.

A.2 INFLUENCE OF PRICE ON MODE CHOICE

Public transit is a normal good in the economic sense that as its price goes up, demand (the number of transit trips taken) goes down. The same holds true for trips by auto. While these relationships are intuitively obvious, efforts to coordinate transportation pricing require further understanding of this connection, including the ability to determine (1) how the demand for a mode changes given a change in its price, and (2) how much of the demand shifts to or from competing modes, as the price of one mode changes. This section reviews what is known about the relationships between price and demand for various types of transportation.

The concepts of *price elasticity* and *cross-price elasticity* are used to define these relative degrees of change. Loosely defined, price elasticity describes the "amount that demand for a good or service changes following a 1% change in its price." Cross-price elasticity describes the "change in demand for a competing (or complementary) good given a 1% change in the price of the first good or service." For example, price elasticity measures the percent change in transit ridership for every 1% change in fares. In contrast, cross-price elasticity measures the percent change in transit ridership for each 1% change in *auto-related prices* (e.g., tolls).

It is clear that raising the cost of one mode will cause a shift of at least some travelers to another mode, while reducing a mode's price generally attracts some people to that mode. What is less clear is the exact nature of these effects. In general, however, it appears that changing transit pricing will have a relatively small effect on solo drivers. Specifically, lowering transit fares is not likely to attract significant numbers of SOV users. The impacts of changing auto-related costs (primarily through tolls or parking rates), on the other hand, can be substantial, depending on the nature of the change. Researchers have determined that the availability of free parking has the biggest impact on mode choice, while *changing* parking prices will have significant, but lesser, effects.

There is a relatively extensive body of literature related to transportation demand. Many of these studies relate to specific demand analyses used to calibrate mode split and other urban transportation planning models in individual metropolitan areas. In this regard, policymakers looking to coordinate transportation pricing in many U.S. cities may be able to use some general elasticity figures that were derived from local data. It is unlikely, however, that the elasticities developed for these general plans would yield sufficient details to evaluate the full range of possible pricing measures. In Boston, for example, price only enters into the mode split models for approximately 25% of trips that are considered to be for home-based work purposes, and it is unclear even for this group whether the elasticities implied by the model coefficients would reflect traveler responses to anything more than minor pricing changes.

A similar set of demand models developed in 1979 by Harvey and others for transportation planning in the San Francisco area has been used to assess the effects of significant changes in transportation prices. Cameron (1991) includes a description of these models, collectively called the Transportation Incentive Planning System (TRIPS), and shows how they are used in predicting the effects of transportation price changes in the Los Angeles area. The report claims that with minor adjustments, the model has been used successfully in metropolitan areas throughout the United States; the elasticities implicit in the TRIPS models are noted in the sections that follow.

Unfortunately, much of the literature presents price and cross-price elasticities without fully identifying how each was derived and how each should be applied. The often missing information includes the type of elasticity calculation (mid-point, log, or shrinkage ratio), the time-frame for evaluating the results, the level of intermodal competition, and whether the elasticity comes from aggregate demand studies or from discrete choice models. This last item may be particularly important. In most of the

aggregate models, the researcher has used empirical time series or cross-sectional data to calculate the demand at different prices. In these cases, direct (own) price elasticities show (for a fare increase) the number of trips reduced on transit; cross-elasticities suggest the number of trips gained by other modes; and the difference indicates the total number of trips lost, that is, trips foregone entirely. With discrete choice models, any trips lost to one mode are (because of the mathematics in these models) distributed among the other identified choices; thus, these models will report no trips as foregone unless "no trip" is among the explicit choices. As "no trip" rarely is a choice, the discrete choice models may tend to exaggerate the cross-price elasticities, whereas the less sensitive aggregate models may underestimate the actual cross-price effects. Note that planners using the standard urban planning process could overcome the lack of a "no trip" option by making selected adjustments to trip generation rates prior to considering mode split.

It should be noted that TCRP Project H-6, *Transit Fare-Pricing Strategy in Regional Transportation Systems,* did not focus on the identification or development of elasticity measures. Two other TCRP projects (TCRP Project H3, *Policy Options to Attract Auto Users to Public Transportation,* and TCRP Project H-4A, *Strategies for Influencing Choice of Urban Travel Mode)* were more specifically concerned with this topic. Nevertheless, it is useful to review the general concepts and findings presented in the literature here in moving toward the development of models/strategies for integrating regional intermodal pricing decisions. The literature on different types of elasticities and the nature of the influence of price on mode choice are presented below.

Price Elasticities for Transit

As reported in the *TCRP Report 10,* "Fare Policies, Structures, and Technologies," transit agencies have used a variety of methods for developing elasticities for use in predicting the ridership impact of a fare change. There are also differences in the application of elasticities; some agencies use a single systemwide elasticity, or perhaps a different figure for each mode. What is becoming increasingly common, however, is to identify a series of elasticities representing the various submarkets making up total ridership. The major types of sources of transit elasticities include the following:

< Time series analysis of the agency's historical ridership data; this often includes a regression analysis to isolate the effects of fare changes from other factors, such as service changes, employment, or fuel prices;

< Before-after ("shrinkage") analysis for a particular fare change;

< Use of a demand function, often based on the results of stated preference surveys (i.e., asking how people would respond to various fare options and changes, or alternatively asking them to "trade off" fare changes with level of service changes);

< Review of industry experience, particularly for agencies of similar size and with similar characteristics; and

 Use of professional judgment in adjusting figures derived from above sources.

There are also various types of elasticity equations; the most common are those known as point elasticity, shrinkage ratio, midpoint arc elasticity, and constant arc elasticity. For small changes (i.e., less than 10%), each formula should produce roughly the same elasticity. However, the midpoint or constant arc elasticity formulas are generally used where larger changes are involved-or where there may be a decrease in some fare categories.

The approach that many agencies take in identifying elasticities is to calculate figures based on their own ridership patterns, and corroborate-and possibly adjust-these numbers based on figures from other properties. This approach is sometimes used for developing market segment elasticities, for instance, based on a single systemwide figure; industry guidelines on ratios of elasticities for different markets-e.g., off-peak ratios are often found to be 1.5 to 2 times peak elasticities-are applied to derive figures for the property.

Despite the range of possible sources and methodologies for identifying elasticities, many transit agencies continue to use the long-time industry standard "Simpson-Curtin Rule." Based on an examination in the early 1960s of a number of fare increases, the formula defines a price elasticity (shrinkage ratio) of transit trips as -0.33. Other work has shown that this is not a constant, and that there is in fact a wide range of price elasticities. The TRIPS model for home-based-work trips, calibrated for Los Angeles conditions, suggests an elasticity of about -0.08, although it is difficult to make a precise inference given the lack of information in the Cameron report about initial conditions for price and other variables. In another study, Goodwin (1992) found an average bus fare elasticity from 50 studies as -0.41. The long-term elasticities are higher than the short-term effects because travelers in the long-run can move or buy a car, whereas they may initially be more captive to the bus.

In what may be the most extensive of the survey reports on transit price elasticities, Lago, et al. (1992) present results from more than 60 studies of elasticities and cross-elasticities. This study disaggregates the effects of price among a variety of conditions and groups, although the actual derivation, magnitude, circumstances, and time frame of the change is not always clear from the text of their review. Another key source of industry experience is an APTA study (1991); *Fare Elasticity and its Application to Forecasting Transit Demand* presented systemwide and peak/off-peak elasticities for 52 U.S. bus systems.

Finally, a key point regarding transit price elasticities is that fare decreases tend to have lower elasticities than do fare increases. This is important because it is likely that a coordinated,

regional pricing scheme would look to lowering costs for mass transit instead of raising them.

Cross-Price Elasticities of Auto Use with Respect to Transit Price

Transit agencies have generally sought to keep fares low in part to meet a regional goal of encouraging travelers to shift from auto to transit. There is little evidence that this in itself represents a meaningful rationale for maintaining low transit prices--although there are other reasons, particularly as related to addressing the travel needs of the low-income transit dependent. Domencich and Kraft (1970) concluded that it would be necessary for transit agencies to pay people to lure them from their cars. Lee (1992) suggests that the issue is quite complex, but that the reality is that the cost of auto travel is such a small part of most household incomes that transit cannot be made sufficiently attractive just by lowering its price. It is generally accepted that improved transit *service* qualities are more important than lower fares in attracting auto users to transit, although it is clearly difficult for transit to provide even a near substitute for the qualities of most auto trips.

Of course, since transit agencies seldom lower their fares, the impact of fare *increases* on auto use is of greater importance in the regional context than is a consideration of the effects of fare reductions. When a transit agency raises its fares in order to generate additional revenue, the ridership invariably falls. While a certain portion of this loss is represented by trips that are simply foregone and others shift to ridesharing, many of the trips are clearly taken by auto. The literature review, however, revealed little in the way of estimation of the effects of fare increases by mode. As explained earlier, demand modeling efforts assume shifts of trips lost from one mode (e.g., transit) to the other available mode(s), but these are limited in that they typically assume that no trips are foregone altogether. Meanwhile, the typical analysis of fare-change effects (either projected or after-the-fact) focuses simply on the change in transit trips, without regard to the "redistribution" of the lost trips.

One study that estimated the effect of a fare increase on auto usage was recently completed by the Massachusetts Bay Transportation Authority (MBTA). The MBTA examined the environmental effects of a 1991 fare increase that decreased weekday systemwide ridership by nearly 6%. In the *Draft Environmental Impact Report on the 1991 Fare Increase,* the MBTA estimated that the total increase in regional VMT was 110,685 VMT per weekday (assuming that all lost transit trips shifted to private automobile), or 0.15% of the regional total of 73 million VMT.

The few other studies that have sought to estimate the effects of fare changes on other modes have found the cross-elasticities of auto use with respect to transit prices to be quite low. A study by Glaister and Lewis (1978), for instance, reports the cross-elasticities, shown in Table A-2, for London by peak and off-peak hours.

Lago et al.(1992) found the mean cross-elasticity of auto demand with respect to bus fares is +0.09 ±0.07 (eight cases), and +0.08 ±0.03 (three cases) with respect to rail fares. These studies suggest that the cross-elasticities related to transit fares are significantly lower than the straight fare elasticities (i.e., typically considered to be on the order of -0.3). On the other hand, as shown in these studies, there is some increase in SOV usage, which counteracts regional air-quality goals.

Price Elasticities for Auto Use

The other--and ultimately more significant--component of the transportation price equation is the impact of changes in the price of auto use. Three areas related to auto use pricing have received considerable study: gasoline, parking, and roadway prices. The direct effect on SOV use is considered in this section, and the effect on transit use is considered in the following section.

The literature on demand for gasoline indicates price elasticities ranging from -0.06 to -0.43 in the short run and from -0.07 to -0.93 in the long run. The drop in gasoline consumption is much greater in the long run in part because of shifts in significant changes in trip origins and destinations (people move) that would not have been possible in the short run. This does reflect a drop in VMT. A much more important reason for the greater long-run drop of fuel price elasticity is that the car fleet changes as people buy more fuel-efficient cars. This would lead to a drop in VMT.

Parking pricing can clearly cause significant changes in mode choice and commuting patterns. Kulash (1973) generally receives credit for finding the strongest evidence of the effects of wide scale parking-price increases. Based on his study of a 25% parking tax instituted in San Francisco in 1970, he derived a parking-price elasticity of the number of vehicles parked to be in the range of -0.20 to -0.31. However, the data also showed a marked drop in the average parking duration, thus indicating an even greater effect of the tax than on just the number of trips. With regard to employee parking, Kulash also derived a price elasticity of 0.29 based on a study of Los Angeles employees with and without free parking. Shoup and Willson (1992) found somewhat lower elasticity rates in their examination of five cases of commuter behavior in the presence of free or paid daily parking, with a derived average price elasticity of -0.16.

Shoup (1994) demonstrates that employer-paid parking encourages solo driving to work. On average, employer-paid parking shifts 27% of all commuters into solo driving from other modes and puts 19 more cars on the road per 100 employees. Among solo drivers whose employers offer free parking, 41% drive alone only because their parking is free. (According to the 1990 *Nationwide Personal Transportation Survey,* some 90% of commuters who drive to work have free parking available at their workplace.) Shoup has

determined that free parking is often worth more to an employee than free gasoline for the round trip; he further cites Pickrell's (1991) observation that free parking can be worth more than free gasoline *plus* a free car for most commuting trips. In fact, the federal gas tax would have to be increased 16 times to offset the value of the average parking subsidy in downtown Los Angeles. Table A-3, which summarizes data from case studies compiled by Shoup (1994), shows significant increases in the drive-alone mode share when employers paid for parking. The price elasticity of demand ranged from -0.08, in Century City, to -0.23, in Mid-Wilshire, with an average of -0.15. These results updated those from earlier studies by Willson and Shoup (1990) that presented before-and-after data from examples in which employers shifted from free parking for employees to paid. While the computed elasticity for Ottawa remained approximately the same, the elasticities for Mid-Wilshire and Warner Center (a Los Angeles area suburban office center) were considerably higher in the earlier studies, at -0.68 and -0.32, respectively.

Employers have powerful incentives to subsidize the cost of parking (Shoup 1993, CUTR 1993). Employer-paid parking subsidies receive favorable treatment in the federal tax code, benefiting employers and employees. First, as a tax-deductible business expense, the cost of parking is exempted from federal and state income tax, Social Security taxes, unemployment insurance taxes, and all other payroll taxes. Second, the cost of parking is considered a tax-exempt fringe benefit for employees (up to $155 per month). In contrast, the tax-exemption for employer-paid mass transit and ridesharing benefits is capped at $60 per month, less than half the limit for parking benefits. Moreover, employees who pay for parking at work cannot deduct this cost as a work-related expense on their federal income taxes. Among others, the U.S. General Accounting Office (1992) concludes that through these tax policies, which favor employer-provided parking over employer-provided transit benefits, current practice keeps this variable cost below its social/full market cost and thus encourages driving to work.

TCRP Project H-3, *Policy Options to Attract Auto Users to Public Transportation,* presents a comprehensive review of literature that addresses parking and the effects of parking costs on travel behavior. The study first reviews literature in a wide range of areas relevant to modal choices and then focuses in greater depth on the relationship between parking factors and travel decisions. For example, the authors cite two studies that estimate the price elasticity of demand for parking as a relatively inelastic -0.31. Nonetheless, one of these studies found that parking costs have a more important impact on mode choice of commuters than vehicular operating costs.

The unpublished TCRP Project H-3 Interim Report also cites the response to various travel pricing measures for five individual cities, based on studies by DHS and ECO Northwest, Inc., using STEP modeling. The estimated impact of a $3.00 employee parking charge on the number of trips taken in these cities is as follows:

< Los Angeles: -2.0% change in trips,
< Sacramento: -2.1% change in trips,
< San Diego: -2.0% change in trips,
< San Francisco: -1.3% change in trips,
< Seattle: -2.4% change in trips, and
< Average: -2.0% change in trips.

If a typical commute averages 12 mi each way at operating costs of $0.25 per vehicle mile, this charge would constitute a 50% increase in out of pocket costs. The implied elasticity of out of pocket parking costs on total trips is -0.04.

The unpublished TCRP Project H-3 Interim Report also notes that the effect of tax-induced increases in parking charges depends on the elasticity of demand for parking, which determines how much of the increase is borne by the user and how much by the supplier. Moreover, reduced parking supply may or may not affect transit use because parking may shift to other locations without shifting travel to transit unless all areas are incorporated in a comprehensive parking plan. For example, higher costs or restricted supply of off-street parking may result in greater on-street parking in nearby residential areas unless a permit program is instituted simultaneously. The study also addresses the equity issues associated with increased travel costs such as higher parking fees.

Shoup (1994) has proposed a program for *cashing out* parking subsidies, whereby employees would receive a taxable cash travel allowance to use for parking, transit, carpooling, or other modes. Shoup estimates that cashing out employer-paid parking subsidies would have the following effects on automobile commuting to downtown Los Angeles:

< Reduce the solo driving share from 69% to 55%,
< Reduce the number of vehicle trips to work by 9,000/day,
< Reduce the demand for parking by 9,000 spaces,
< Reduce VMT for work trips by 285,000/day,
< Reduce gasoline consumption for automobile commuting by 3.5 million gallons/year, and
< Reduce the total cost of automobile commuting by $40 million/year (17%).

Besides parking prices, the other key focus in the literature is road pricing, including tolls and congestion pricing strategies. There are no areawide road pricing schemes in the United States from which to draw relevant empirical evidence of the effect of this approach on auto demand. The TRIPS model estimates that a $.15 per mile average fee on southern California roads, with traffic volumes approaching capacity, would yield a 5% drop in VMT, and a 3.8% drop in trips. Lack of information on which roads and what drivers would

TABLE A-2 Cross-elasticities in London for pk-hr service

Price Change		Change in Peak Auto Use
Bus	Peak	.025
	Off-Peak	.0016
Rail	Peak	.056
	Off-Peak	.0034

TABLE A-3 Change in SOV mode share in response to parking charges

	Who Pays for Parking			
Case Study Location	**Employer**	**Driver**	**Change**	**Elasticity**
Mid-Wilshire (LA)	42%	8%	-76%	-0.23
Warner Center (LA)	90%	46%	-49%	-0.18
Century City (LA)	92%	75%	-18%	-0.08
Civic Center (LA)	72%	40%	-44%	-0.22
Downtown Ottawa (Ontario)	35%	28%	-20%	-0.10
Washington (DC)	72%	50%	-31%	-0.13
Downtown Los Angeles	69%	48%	-30%	-0.15
Average	67%	42%	-37%	-0.15

Source: Shoup 1994

be affected by these costs prevents the calculation of an elasticity covering this impact. Among other studies, Wuestefeld and Regan (1981) reviewed the effects on certain toll roads and found the elasticity of use with respect to toll increases to range from -0.03 to -0.31, with the largest changes appearing to be on the shortest roads. The longer roads in their study (such as the Pennsylvania Turnpike) would have the lowest elasticities because they offer the fewest alternative routes and the greatest time savings. The New York Regional Plan Association estimated that the toll authorities would have to charge $10.00 per vehicle in order to reduce peak-period traffic delays at the Hudson River tunnels between New Jersey and Manhattan. It is possible, however, that this analysis does not account for changing price elasticities with higher tolls. According to the Golden Gate Bridge and Transit District in San Francisco, the agency charges a $3.00 toll and estimates the effects of further changes with an elasticity of -0.10. Ten years ago, when the toll was $1.00, the District used an elasticity of -0.01.

The relatively low elasticities of auto trips with respect to price raises a common perception among analysts that imposition of small fees has little impact on travel behavior. However, Shoup (1994) demonstrates that the mode shifts in response to changes in parking price are quite significant despite the low derived elasticities. Table A-3 shows that charging for parking (on average)

reduced the share of solo driving from 67% to 42%, a decrease of 37%. Similarly, eliminating the parking subsidy reduced the number of cars driven to work from 72 to 53 per 100 employees, on average, a 26% decrease. He characterizes these shifts as "enormous" in comparison to results obtained from other transportation demand measures, such as free transit passes or guaranteed rides home for carpoolers.

Bhatt (1994) proposes congestion pricing for the Washington, DC, region and discusses which facilities would be priced as well as attendant issues such as operation and enforcement, legal impediments, feasibility and acceptance, and institutional issues. He presents a quick and rough estimate of potential effects of 4.0-12.0 million reduction in daily VMT, a 10-15 min reduction in average round-trip travel time, and 10-30 fewer tons per day in volatile organic compounds. These benefits are based on an assumption of program coverage of major corridors within a 700 sq mi area, served by 250-300 pricing points, charges of $0.15/VMT during the 6:30-9:30 a.m. and 3:30-6:30 p.m. peak travel periods, and 4-5 million vehicle trips per day facing charges. He notes the need to coordinate policies to prevent spillover into neighborhoods, and suggests that bus transit using HOV and other tolled roadways would benefit from reduced congestion, attracting greater ridership.

In an earlier study, Steiner (1992) drew analogies from other industries--in this case, electric utility demand-side management. She concluded that congestion pricing gives proper price signals through its effect on variable costs of driving but that price inelastic demand of commuter traffic, political barriers, and equity considerations will make implementation difficult. For example, she cites studies that indicate commuter willingness to pay tolls as high as $0.25/mile to save time. (Note that, by implication, demand is only "inelastic" if *some drivers* get off the road so the remaining paying drivers can save time.) She also notes that any transportation demand management policy must be implemented uniformly throughout a region to achieve its intended objectives.

Cross-Price Elasticities of Transit Use with Respect to Auto Price

While numerous studies have shown that increasing the costs of driving has reduced the share of drive-alone commuting, the effects on transit use are less clearly understood. Raising the price of auto travel will lead some motorists to shift to transit, but the greatest effect of a price increase--assuming that the price change is noticeable at all--would likely be in the growth of ridesharing or simply fewer trips. Nevertheless, the relative proportions of trips taken by transit versus auto is so lopsided in most areas that a small percentage of auto trips lost to transit would mean a much larger percentage of transit trips gained from auto. (Regarding elasticity assumptions, Lago reports that the mean cross-elasticity of transit demand with respect to total automobile costs is +0.85.)

Willson (1992) used data from a 1986 mode-choice survey of downtown Los Angeles office workers in a logit model for mode choice and parking demand. He estimated that elimination of free parking would reduce SOV share from 72% to 41%, increase carpool share from 13% to 28%, and double the transit share from 15% to 31% of employee travel. The computed cross elasticity for transit was +0.35.

Kain (1994) looks at the relationship between congestion pricing (or comparable increases in driving costs) and mode choice in some detail. Because they have generally not addressed the effects of congestion pricing on transit use, Kain believes, "previous analyses and discussions have very likely underestimated the shift to transit that would take place with the implementation of congestion pricing and overestimated the level of tolls that would be required to achieve desired congestion levels." (Kain, p. 531) He attributes this lack of analysis to two factors: "(a) the effects are complex and (b) obtaining estimates about the effects of congestion pricing on transit use requires detailed and explicit assumptions about both the level of congestion tolls and their effects on the speeds of roadway segments that are used by transit vehicles."

As suggested above, since transit accounts for only a small percentage of peak-period trips, even a small percentage shift from SOVs to transit would have a significant impact. Kain concludes that "...the increases in transit ridership that would result from implementation of congestion pricing would greatly increase transit deficits and create serious fiscal problems for already hard-pressed local governments, who currently directly or indirectly fund the bulk of operating losses." (Kain, p. 533)

Implementing congestion pricing would make transit and carpooling more attractive. First, solo driving would become more expensive in relation to high-occupancy modes. Second, reducing roadway congestion will improve trip times and reliability for these alternative modes. (Even rail trips with exclusive rights of way would benefit from improvements in road-based passenger access.) Third, as Shoup (1994) also points out, congestion pricing would increase the number of potential carpool matches as more commuters seek alternative modes. Finally, if transit demand increases sufficiently, transit operators might respond by expanding service frequencies and route coverage--thereby further increasing transit demand.

In general, the relationship between transit and carpooling is not well understood. Shoup (1994) hypothesizes that cashing out parking would "reshuffle cars and commuters in some surprising ways." Not only would carpooling increase, but this shift could increase the number of people commuting to work in automobiles, especially if former solo drivers recruit transit passengers for their new carpools. Moreover, if transit passengers shift to carpools, cashing out parking could reduce peak-hour transit ridership.

Finally, DeCorla-Souza and Gupta (1989) explore the effect of auto pricing and transit policies (including HOV) working together to shift travel demand to higher occupancy transportation. In their analysis, they used computerized travel models to forecast mode choice under several alternative policies. For example, under a transit-preferential strategy, which included high-level peak-period transit supply and pricing policies to encourage transit (reduced fares) and discourage auto use (tolls and parking charges), they forecast a 35% contraction in peak-period SOV work travel in the year 2010 compared to a traditional context. They forecast that policies focusing only on ride-sharing would be less effective and that a combination transit/ride-share strategy would divert more travelers from SOV, though transit would capture fewer of these than under a transit-only focused strategy. This study was instrumental in the development of transit and ridesharing policies in Toledo, Ohio's Year 2010 Transportation Plan to ameliorate congestion anticipated for the area.

A.3 MODELS FROM OTHER INDUSTRIES

Finally, it may be instructive to review how other industries have used pricing to affect demand among alternative or complementary commodities or have used total cost analysis to assist in planning. None of these use models/strategies that would appear to be directly transferable to the development of intermodal public transportation pricing approaches, because of, for instance, the large number of decisionmakers/stakeholders involved in the regional transportation setting. Other industries, however, provide certain conceptual frameworks, as well as lessons, that should be considered in making regional transportation pricing decisions. Utility industries are the richest source of relevant information, and the telecommunications industry has long experience with utilizing pricing to affect demand and to accomplish social goals. Electric and gas utilities in particular have experience with time-of-day pricing, and are leaders in the use of total cost analysis to assist their long-range planning and pricing.

With regard to the relevant literature in this area, Gillen (1994) examined several industries/markets for lessons regarding the feasibility and implementation of time-of-day road pricing. These industries include electric utilities, telecommunications, airport runways, and transit. All of these markets showed that pricing can be effective in influencing demand. They also provide some important general lessons regarding implementation of pricing strategies. One lesson is that the handling of equity and social issues is a key factor in the public acceptance of new pricing approaches. In all the markets, there was a recognition that there needed to be a balance between accomplishing social goals (e.g., providing telecommunications and utility service to low-income individuals) and obtaining the most efficient pricing strategy. A second lesson was that, in all the markets, institutional changes led the move to more efficient pricing. Gillen concludes that the introduction of road pricing may therefore need to be preceded by some institutional change "that distances roadway managers (and price setters) from government and politicians" as this would affect "both manageability objectives and the public attitude to road pricing as a tax grab" (p. 148).

As suggested above, the electric and gas utilities have made extensive use of total cost analysis to make decisions regarding investments and pricing. The total costs are summed as of one or more target dates--assuming that no changes are made by the utility. Following this, the effects of a range of supply- and demand-side measures on total costs are analyzed, separately and in combinations. The supply-side measures include capacity increases, while the demand-side measures include changes in pricing to affect the level and timing of demand, as well as actions such as providing discounted installation of insulation.

Air pollution credits are another area that may provide a conceptual model for transportation and transit pricing. The basis of this strategy is that every company in an area is required to produce no more than a certain level of specific pollutants. If the company produces less pollution, it can sell its remaining "right to pollute" to another company in the area. In addition, the government also sells a limited amount of pollution rights. This represents a change in philosophy from relying exclusively on non-market mechanisms (i.e., limits on the production of pollutants) to combining this with the use of pricing. A great deal has been written to date about how this approach should operate; however, the strategy is still new and there has been little analytical work regarding the extent to which actual operations have matched with expectations or, regarding lessons to be learned, for adding pricing to an environment currently limited only by non-market mechanisms.

Overall, it is apparent that HOV (including transit) demand can be significantly influenced by changes in auto-related costs, especially parking prices. While the effect is apparently smaller, changes in transit fares also affect the use of SOVs. These relationships represent key principles underlying the argument for pursuing intermodal pricing:

< Transit ridership grows from increases in parking and roadway costs, thereby leading to lower congestion and pollution.

< Increases in transit fares lead to greater solo driving and greater congestion and pollution.

Developing any type of regional pricing coordination will therefore require, first of all, the establishment of consensus (i.e., among transit agencies and stakeholders affected by auto-related charges) regarding (1) the overall transportation goals in a region and (2) a commitment to work toward these goals cooperatively. Such coordination might take the form of integrated

planning for price changes or cross-subsidization of modes.

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APPENDIX B

EXAMPLES OF SELECTED TRANSIT PRICING AND SUBSIDY PROGRAMS

This appendix presents examples of integrated transit pricing arrangements, findings regarding the effects of employer fare-subsidy programs, and selected incentive programs for promoting employer fare subsidies.

B.1 INTEGRATED TRANSIT PRICING

Reviewing the specific experience of transit operators related to the coordination of pricing and fare payment/collection arrangements can illustrate some of the issues involved in developing and implementing coordinated intermodal pricing strategies. Included below are examples of (1) interoperator agreements permitting transfers between adjoining transit properties and (2) integrated fare payment among multiple operators.

Inter-Operator or Intermodal Pass or Transfer Agreements

In many regions having multiple transit operators, individual operators have established formal arrangements with other operators allowing the mutual acceptance of certain types of fare media. Examples of three different approaches are summarized below.

Chicago. Two types of cooperative approaches have been in place in the Chicago area. The Chicago Transit Authority has had separate agreements with the other two transit operators in the region: Metra (commuter rail) and Pace (bus and van service outside of Chicago). CTA and Pace have traditionally priced their passes the same and accepted each other's monthly passes. Metra has offered a CTA "link-up pass" that allows use of CTA as well as Metra; this pass requires payment (in addition to the regular Metra pass price) of half the price of the CTA monthly pass. Of course, these agreements have been facilitated largely by the fact that all three properties fall under the aegis of an umbrella agency, the Regional Transportation Authority (RTA).

Orange County (CA). An example of such arrangements between properties *not* linked through an umbrella agency can be seen in Orange County. The Orange County Transportation Authority (OCTA) and the Metrolink commuter rail service offer a free transfer to/from the other service with presentation of some form of prepaid instrument. OCTA has somewhat different arrangements with other connecting operators; a discounted fare ($0.30) is paid for transferring to/from Amtrak commuter rail, while interagency transfers with other transit systems are either free (e.g., North San Diego Transit District, La Mirada Transit) or $0.10 (e.g., Los Angeles County Metropolitan Transportation Authority, Long Beach Public Transportation Co.). OCTA negotiates separate agreements with each property.

Southeast Florida. Four transit properties in Southeast Florida (Metro-Dade Transit Agency, Broward County Transit, Palm Beach County Transportation Authority, and Tri-County Commuter Rail) executed a Memorandum of Understanding regarding the fares on the commuter rail (Tri-Rail) and connecting bus and rail service. The agreement stipulates that "...no fare will be charged for any route established solely to service the Tri-County Commuter Rail service." Tri-Rail in turn provides payments to each of the three local operators; the payments are based on each property's farebox recovery ratio. The three local operators also have separate agreements among themselves, requiring different transfer/upgrade fares between intersecting services (i.e., Palm Beach and Broward, and Miami and Broward). Finally, in an effort to move toward more comprehensive regional integration, the Center for Urban Transportation Research (CUTR) conducted a *Fare Coordination Study* (1994) designed to consider other fare coordination approaches for the four properties. CUTR recommended a range of strategies, including standardizing fare policies and offering more convenient regional media (e.g., a Daily Regional Pass and a Multi-Agency Pass).

Integrated Fare Payment

Beyond the types of inter-local agreements regarding acceptance of fare media described above, several regions have begun to develop comprehensive fare integration programs involving multiple operators. This has been approached through either an institutional strategy or a technological strategy. Two examples of regional integration efforts now underway are described briefly below.

San Diego. The San Diego region has achieved regional fare integration by establishing a uniform fare structure for the region's operators. Most of the region's fixed-route operating entities have banded together to form a "federation" of transit service providers called the Metropolitan Transit System (MTS); the purpose of MTS, and the related MTS symbol, is to identify this unified transit system to the public. The MTS includes bus and light rail (San Diego Trolley) service. The Metropolitan Transit Development Board (MTDB) serves as the policy setting and overall coordinating agency for public transportation in the metropolitan area. MTDB, as the state designated regional transportation coordinating agency, took the lead in establishing fare integration and developed the Uniform Fare Structure Agreement in conjunction with the San Diego Association of Governments (SANDAG). This agreement applies to fixed-route operators only, although dial-a-ride operators participate in the agreement, and extends beyond the jurisdiction of MTDB to include the North San Diego County Transit Development Board bus and commuter/express rail (Coaster)

services. The basic elements of the agreement, which is updated annually, are that it does the following:

< Establishes a uniform fare structure for the region, providing a coordinated transit system in a multi-operator environment;

< Establishes a regional transit pass valid for travel on all fixed-route services in the San Diego region, and establishes a formula for distribution of pass revenue; and

< Establishes a regional policy of free transfers between equal or lower levels of service and sets upgrade fares for transfers to higher levels of service.

The methodology for allocation of revenues from passes and other prepaid media is that the participating operators submit monthly summaries of rides taken with prepaid media (as well as transfer upgrades) to SANDAG, which then determines the relative proportions of revenue for each operator. Based on these proportions, MTDB then pays each operator its portion.

San Francisco Bay Area. TransLink is a program designed to institute a common-use stored-value fare card for multiple transit properties in the Bay Area. It will allow the passenger to use a single fare card on any of the participating systems, on both bus and rail (BART, Muni, and Santa Clara Valley). A central clearinghouse will be established to handle card management (issuance, distribution), revenue management (collection, reconciliation, and settlement), and ridership tracking. The program was initiated and has been developed by the Metropolitan Transportation Commission and its partner properties. The initial TransLink ticket was a magnetic-stripe stored-value ticket, and was tested at BART and on two bus systems (CCCTA and BART Express). The technology basis of the program, however, has been reevaluated by MTC and the individual agencies; the program is now being developed based on "smart card" technology.

B.2 EFFECTS OF SUBSIDY PROGRAMS

As discussed in Chapter 2, many employers subsidize transit usage to some extent, either through regional transit vouchers or distribution of monthly passes. Both programs offer a way to help equalize the effects of free or heavily discounted parking, as well as to offset the effects of a transit fare increase. Consequently, subsidy programs are important to consider in reviewing transit-pricing elements.

The effects of fare-subsidy programs vary among cities and employment sites. Effects of fare subsidies will vary according to fare levels, pre-existing transit use, transit service levels, employer size, parking availability, required co-payments, and the level of subsidy. Findings from recent studies of the effects of transit voucher programs are presented below.

New York. Three studies have been done of the effects of New York's TransitChek program, although the results of the most recent effort are not yet available. The first, a survey of employees at the first 500 employers to enroll, was done in 1989, when the maximum subsidy level was $15.00 per month. This study generated responses indicating that transit use had risen by 17% and that auto use had decreased by 16%. The second New York study, which used essentially the same methodology as the first, assessed the impacts at one major employer-The Port Authority of New York and New Jersey. This second study was done in 1990 and yielded these results (basically corroborating findings of the first study): transit ridership was found to rise by 22% for commuting trips and 21.5% for non-commuting trips, and vehicle (auto and taxi) use was found to fall by nearly 23% for commuting trips and 21.5% for non-commuting trips. Among Port Authority employees, roughly two new transit trips were created each month for each $15.00 voucher redeemed.

Milwaukee. The Milwaukee County Transit System (MCTS) Commuter Check Program began in 1991. MCTS uses $7.00 and $9.00 vouchers for its program, because it has only weekly passes. The lack of monthly passes had generally precluded pass subsidies before the voucher program began. Having low denomination vouchers, Milwaukee employers have the option of providing subsidies of different levels, such as $7.00, $14.00, $21.00 or $28.00 a month. (The $9.00 voucher began late in 1994, after an MCTS fare increase.) MCTS has tracked impacts of Commuter Check at four employers, each with different subsidy factors. At the employer (a downtown bank) that subsidizes $7.00 a month, MCTS reports that ridership grew by 16%. At a medium-sized law firm that subsidizes $14.00 a month, ridership grew by 26%. At a major utility, where the parking price rose from $20.00 to $40.00 a month at the same time that transit fare subsidies of $21.00 a month began, transit use rose 81%. Finally, at an insurance company that began monthly subsidies of $21.00, with no change in parking prices but some concurrent increases in company employment, transit ridership also rose more than 80%.

San Francisco. In late 1994, the Metropolitan Transportation Commission (MTC) performed a thorough study of the impacts of the Bay Area Commuter Check program by sending surveys to employees at 239 of the employers that had purchased vouchers. These employers were essentially all the firms that had purchased vouchers between October 1992 and April 1994 and remained active in the program. The Bay Area program began in September 1991, and through March 1995, more than 700 employers had purchased Commuter Checks. The Bay Area's survey results are still being analyzed, but some initial results were obtained. The overall results of the survey are consistent with the findings noted above, but extend further. Key findings of the survey were as follows:

< More than one-third of the recipients of Commuter Checks report riding increases, with more occurring at employer locations outside San Francisco. Transit *commuting trips* were calculated to rise by 31% for the full study, 25% at San Francisco employers and 48% at employers outside San Francisco. *Non-commute trips* were found to grow by 29% for the overall survey, and grew slightly more in San Francisco than outside the city.

< The overall increase in transit trips (including both commute and non-commute trips) was calculated to be 3.24 trips per week (3.03 in San Francisco and 3.74 outside the city). As roughly 10,000 people received Bay Area Commuter Checks per month in 1994, the added trips suggest Commuter Check generated about $1.6 million of new transit revenue in 1994. As program growth is expected to increase average participation to 15,000 employees per month in 1995, the current increment in transit operator revenues is estimated at $2.4 million.

< Nearly 60% of all employees surveyed reported that they receive a $20.00 Commuter Check each month, with 29% receiving a $30.00 Commuter Check and 12% receiving more or a different level. Yet, surprisingly, there was no correlation between the Commuter Check value received and amount of induced usage. The *fact* that fares are discounted may have more impact than the *level* of the discount.

< Those who reported transit riding increases for commute trips represented 33.8% of all respondents; 66.2% reported no increase. In looking at the results, it is evident that those who increased their use of transit for work trips had been riding at lower frequencies than the overall sample. This is entirely logical, given that those already riding regularly had less opportunity to further increase their use. Yet, these data also suggest that the "first dollars" of subsidy may be far more important than the last dollars, as regards new transit trips induced, and that considerable reduction in auto trips could result from very nominal subsidies on a far more widespread basis.

< Further analysis of the Bay Area data is now ongoing. Refined understandings are expected to arise as the data are further disaggregated by the dollar amount of subsidy received, the geographic locations of the employers, the reported increases in transit usage, and other factors.

B.3 STATE AND LOCAL PROGRAMS PROMOTING EMPLOYER FARE SUBSIDIES

A number of cities and states have introduced tax credit and incentive programs promoting the use of employer fare subsidies. Selected examples are described below.

Southern California Emissions Reduction Ordinances

The city of Los Angeles and the South Coast Air Quality District in California have evolved through several versions of emission reduction ordinances, including provisions for employer transit fare subsidies. In 1988, the Los Angeles City Council adopted an ordinance that required employers with 100 or more employees to offer a $15.00 transit fare subsidy to all employees using (or interested in using) transit to commute to work, if the employer offered free or subsidized parking to any employee. By 1990, the administration of this program was integrated with the progressive implementation of Regulation XV, which applied to the four counties in the South Coast Air Quality Basin. Regulation XV was a mandatory employee trip-reduction program. In 1995, in response to a prohibition on mandatory trip-reduction plans by the California legislature and amendments to the federal Clean Air Act that permit equivalent emissions reduction strategies, the South Coast Air Quality Management District rescinded Regulation XV and and its successors, Rule 1501 and Rule 1501.1 and replaced them with Rule 2202, a nonmandatory trip-reduction program. Rule 2202 permits a variety of options for employers: (1) emission reduction strageties, such as old vehicle scrapping, clean on-road vehicles, clean off-road vehicles, remote sensing, and other approved efforts; (2) the Air Quality Investment Program (AQIP), a per employee payment into a special fund for emission-reduction projects; and (3) an employee commuter-eduction program known as employee ridesharing. Ridesharing includes car and van pooling, bus and rail programs (which include transit fare subsidies), bicycle programs, and walking programs.

In September 1996, SB 836 was enacted into law by the California legislature, providing an approach for the gradual replacement of mandatory Rule 2202 with a voluntary program. Under SB 836, worksites with 100 to 249 employees are no longer required to comply with Rule 2202 for a demonstration period of 18 months. The ultimate replacement of Rule 2202 depends on whether the voluntary program can achieve equivalent emissions reductions compared with what would have been achieved had the exempt worksites remained regulated. SB 836 also includes demonstration funds for marketing activities in support of voluntary ridesharing efforts, which may include transit fare subsidy projects.

Proposed New York City Fare-Subsidy Ordinance

In 1994, a New York City Council bill was introduced to require city companies that pay for employee parking to offer the full $60.00 transit benefit to its workers.

Connecticut Matching Subsidy Program

The Connecticut Department of Transportation is providing matching subsidies for employers that provide employee fare discounts. The state is matching subsidies for train, bus, or vanpool commuting at $1.00 for every

$2.00 of employer expenditures. The monthly maximum is $20.00 per employee (equaling $60.00 of total monthly subsidy per employee), and the maximum subsidy period is 1 year.

California Tax Credits

Employee fare subsidies are eligible for tax credits, based on a sliding scale related to the provision of free or subsidized parking. If the employer provides no free or subsidized parking, 40% of the fare-subsidy expense is eligible for the tax credit. If the employer provides only subsidized parking, 20% of the fare subsidy expense is eligible for the tax credit. If the employer provides free parking, 10% of the fare subsidy expense is eligible for the tax credit. The costs of vans purchased for employee vanpools is also subject to a 20% to 30% tax credit. Between 1990 and 1993, 941 companies filed for a total of roughly $718,000 in tax credits.

Connecticut Tax Credits

A fixed sum maximum total tax credit was budgeted for 1994 by the Connecticut Legislature at $1.5 million, and is expected to raised to $3 million in 1995. The tax credits are available for eligible ECO-related implementation costs. The implementation of this program was delayed, with reporting forms for the 1994 tax credits not provided until spring 1995.

Delaware Tax Credits

The TraveLink Tax Credit Act was passed in 1989. It allows employers of 100 or more to be eligible for direct tax credits for allowed expenditures supporting traffic mitigation efforts. It functions as a dollar-for-dollar credit toward state tax credits owed.

New Jersey Tax Credits

For eligible ECO program costs (items included in a state-approved ECO compliance plan for the company), up to $36.00 per employee in 1994 and $72.00 per employee in 1995 may be claimed by employers as a credit against state taxes. While eligible expenses could include many other types of program costs, the maximum tax credit amounts were set as 5% and 10% respectively of the $720 per year maximum tax-free benefit that employers can provide to their employees to subsidize travel.

APPENDIX C

APPLICATION OF INTERMODAL PRICE COORDINATION IMPACT ASSESSMENT METHODOLOGY

C.1 HYPOTHETICAL EXAMPLE--INTRODUCTION

To illustrate the use of the conceptual approach proposed in this project, a hypothetical example was developed. The project final report describes a coordinated intermodal pricing strategy for the hypothetical Gotham City region. Gotham City was identified as a large midwestern city located on Lake Gotham. The region's transportation characteristics can be summarized as follows. The Metropolitan Gotham Transit Authority (MGTA) operates a multimodal system, comprising bus and rapid rail transit. The annual operating budget is about $200 million. Population of the service area is approximately 2 million. The MGTA service area includes Gotham City and the suburbs of Alfred, Gordonville, and Robinwood. The MGTA Board of Directors includes representatives from these municipalities and three members appointed by the Governor. The Gotham Turnpike Authority (GTA) operates both the Gotham Turnpike and the toll bridge over the Wayne River. The state DOT has responsibility for all other highways. The Gotham Metropolitan Planning Organization (GMPO) includes representatives from Gotham City, its suburbs, MGTA, GTA, and the State Highway Department.

The final report explained that, like many older midwestern cities, Gotham is losing population, jobs, and retail activity to its surrounding suburbs. Transit is unable to serve these new suburban markets effectively, and regional traffic is growing as a result. Traffic congestion is particularly noticeable on the Wayne Bridge. MGTA receives federal, state, and local assistance, but has no dedicated funding source. Recent fiscal circumstances have forced the state to reduce its operating assistance, and the MGTA faces a shortfall of $5 million next year.

The GTA's Wayne River toll bridge charges a $1.00 toll, collected in both directions throughout the day, while MGTA fares are also $1.00 for buses and trains systemwide. Both GTA and MGTA have decided independently to increase the bridge toll and transit fares to raise additional revenue, and the GMPO has led the effort to analyze the effects of price changes on commuting behavior and agency revenues. This appendix describes the details, including underlying assumptions, of the analysis of potential ridership and revenue impacts associated with various actions or strategies (i.e., several possible fare/toll combinations).

C.2 PRICE AND CROSS-PRICE ELASTICITIES

To perform this analysis, GMPO planners first made assumptions regarding transit and auto demand elasticities with respect to transit and auto price changes. As indicated earlier, a *price* elasticity of demand represents the percent change in demand for a transportation service given a 1% change in the price of that service. A *cross-price* elasticity of demand represents the percent change in demand for a transportation service given a 1% change in the price of a *competing* service. Table C-1 shows typical values and ranges of values for price elasticities and cross-price elasticities of demand with respect to the competing services of automobiles and transit. The data in this chart summarize the results of the elasticity research reviewed in Appendix A, and were used by GMPO to determine appropriate estimates for the pricing changes under analysis.

GMPO, which believed that the "average" value for the price elasticity of demand for transit service with respect to transit fares (upper left quadrant of Table C-1) was appropriate in this case, used the corresponding value of -0.30 in its analysis. As explained in Appendix A, and as evident in Table C-1, *cross-price* elasticities *(between* transit and auto modes, as represented by the upper right and lower left quadrants in the table) have received much less research attention than *price* elasticities, and therefore required additional judgment on the part of GMPO planners to determine appropriate values in this case. Recognizing that there is rail transit service in the MGTA system, a cross-price elasticity of 0.06% change in auto demand (which is within the empirically determined "rail travel" range) with respect to a 1% change in transit fare was chosen. Data on cross price elasticities of transit demand with respect to auto costs were even more scarce, so the GMPO decided to test two estimates in order to establish a range of likely outcomes. The "low" cross-elasticity estimate used was 0.20, while the "high" value was 0.60. Finally, a price elasticity of auto demand with respect to auto costs was estimated from the range given for "toll" based costs. The upper limit (-0.31) reflects empirical evidence from road facilities with abundant travel alternatives (including other streets and transit services) and the lower value reflects a road with limited alternatives (such as a bridge). Because the toll facility in question is a bridge and because transit service alternatives are available, an intermediate value of -0.20 was chosen for this elasticity.

C.3 ESTIMATED EFFECTS OF ALTERNATIVE PRICING STRATEGIES

Under present conditions, 55 million vehicles use the toll bridge annually, while 70 million trips are made on MGTA buses and trains per year (approximately 14 million of which occur in the toll bridge corridor). Table C-2 summarizes the results of GMPO's entire analysis and Tables C-3 through C-5 detail the methodology that the GMPO planners used to determine the impacts of various pricing strategies in a worksheet format; the same basic

TABLE C-1 Empirically estimated values for price and cross-price elasticities*

	% Change in Transit Demand		% Change in Automobile Demand		
			low range	high range	
1% Change in Transit Fare	-0.10	home to work commute	0.03	0.08	rail travel
	-0.15	rail travel	0.07	0.09	bus travel
	-0.20	peak period			
	-0.30	average			
	-0.35	bus travel			
	-0.40	off peak travel			
			low range	high range	
1% Change in Auto Costs	0.35	parking fees	-0.06	-0.43	gas tax (short range)
	0.85	average total auto costs	-0.07	-0.93	gas tax (long range)
			-0.10	-0.23	parking fees
			-0.08	-0.27	(downtown)
			-0.03	-0.31	parking fees (suburban)
					tolls

* See Appendix A for sources of these values

methodology was used (with different input variables and results) to analyze alternative pricing strategies.

Initially, MGTA arranged for the GMPO to conduct an analysis of the impacts of increasing fares to $1.10 systemwide--assuming GTA tolls would remain the same. In the Table C-3, Scenario 1, the current conditions were identified as described above, and current passenger and toll revenue was determined to be $70 million and $55 million, respectively ($1.00 per passenger or vehicle). The transit fare increase was calculated to be 10%, while the toll charge remained the same. The demand elasticities described above were entered into the worksheet, and the corresponding changes in transit and auto demand were calculated based on these elasticities and the change in transit fare and auto cost. Note that since there was no change in auto cost in this analysis, there was also no change in the components of transit and auto demand related to auto cost. In this case, the non-toll corridor and toll corridor commuters were affected equally by the transit fare increase, but in potential scenarios where a toll is added, that cost will only affect the subset of commuters in the toll corridor. Therefore, the impacts on travel behavior were calculated for both the toll corridor *and* the overall transit system area. These results and their corresponding revenue implications are detailed at the bottom of Table C-3.

Although this initiative would provide most of the $5 million needed to balance the MGTA budget, the MPO officials were discouraged that raising transit fares would decrease annual transit ridership by more than 2 million passengers systemwide and increase automobile traffic in the toll bridge corridor by more than 300,000 vehicles annually--conditions that ran counter to their regional transportation and clean air goals. However, GMPO soon learned that GTA would be raising tolls on the Wayne River Bridge to $1.25, and conducted a new analysis of the impacts of increasing *both* tolls and fares. As summarized in Table C-2, the combined toll and fare increase (Scenario 2) raised more than the requisite $5 million for MGTA. It also reduced the projected overall loss of transit riders resulting from a fare increase alone and decreased congestion on the toll bridge. When the low estimate of the cross elasticity of transit demand with respect to auto use was assumed (Table C-2, box A), annual transit ridership was off by 1.4 million systemwide, but up by nearly 300,000 in the toll corridor, while traffic on the bridge was thinned by almost 2.5 million vehicles. Using the high estimate of the cross elasticity of transit demand with respect to auto use (Table C-2, box B), more than 1.6 million transit trips were added in the toll corridor-nearly canceling out the ridership loss experienced by the remainder of the system. A worksheet detailing the calculations involved in Scenario 2 is presented in Table C-4.

The outcome of the combined increase strategy prompted the MPO planners to consider the implications of a coordinated intermodal pricing strategy whereby transit fares would remain at $1.00 and toll bridge users would pay $1.35 (a $1.25 toll with a $0.10 congestion mitigation and transit enhancement "surcharge"). In this plan (Scenario 3), the excess toll revenues (above that which would have accrued from a $1.25 toll) would be used to meet the revenue goals of MGTA, while further reducing congestion on the toll bridge and *increasing* transit ridership. To perform this analysis, GMPO first calculated the impacts of a $1.25 toll with no fare change or transit

TABLE C-2 Impacts of alternate intermodal pricing strategies in Gotham City

A: Low Cross Elasticity of Transit Demand with Respect to Auto Cost	Baseline	Scenario 1	Scenario 2	Scenario 3	
		Toll Same, Fare Increase	Toll Increase, Fare Increase	Toll Increase, Fare Same	Toll Increase plus Surcharge, Fare Same
Toll:	$1.00	$1.00	$1.25	$1.25	$1.35
Transit Fare:	$1.00	$1.10	$1.10	$1.00	$1.00
Change in Annual Toll Bridge Trips	*0*	*330,000*	*-2,420,000*	*-2,750,000*	*-3,850,000*
New Annual Toll Bridge Trips	*55,000,000*	*55,330,000*	*52,580,000*	*52,250,000*	*51,150,000*
New Annual Toll Revenue:	$ 55,000,000	$ 55,330,000	$ 65,725,000	$ 65,312,500	$ 69,052,500
Change in Annual Transit Trips - Toll Corr.:	*0*	*-417,900*	*278,600*	*696,500*	*975,100*
New Annual Transit Trips - Toll Corr.:	*13,930,000*	*13,512,100*	*14,208,600*	*14,626,500*	*14,905,100*
Change in Annual Transit Trips - Overall:	*0*	*-2,100,000*	*-1,403,500*	*696,500*	*975,100*
New Annual Transit Trips - Overall:	*70,000,000*	*67,900,000*	*68,596,500*	*70,696,500*	*70,975,100*
New Annual Transit Revenue - Overall:	$ 70,000,000	$ 74,690,000	$ 75,456,150	$ 70,696,500	$ 70,975,100
Change in Annual Toll Revenue	**$ -**	**$ 330,000**	**$ 10,725,000**	**$ 10,312,500**	**$ 14,052,500**
Change in Annual Transit Revenue	**$ -**	**$ 4,690,000**	**$ 5,456,150**	**$ 696,500**	**$ 975,100**
"Excess" Toll Revenue (above $1.25 toll):	$ -	$ -	$ -	$ -	$ 3,740,000
Total Increase in Revenue to Transit:	$ -	$ 4,690,000	$ 5,456,150	$ 696,500	$ 4,715,100

ELASTICITIES TABLE	*% Change in Transit Demand*	*% Change in Auto Demand*
1% Change in Transit Fare =>	**-0.30**	**0.06**
1% Change in Auto Cost =>	**0.20**	**-0.20**

B: High Cross Elasticity of Transit Demand with Respect to Auto Cost	Baseline	Scenario 1	Scenario 2	Scenario 3	
		Toll Same, Fare Increase	Toll Increase, Fare Increase	Toll Increase, Fare Same	Toll Increase plus Surcharge, Fare Same
Toll:	$1.00	$1.00	$1.25	$1.25	$1.35
Transit Fare:	$1.00	$1.10	$1.10	$1.00	$1.00
Change in Annual Toll Bridge Trips	*0*	*330,000*	*-2,420,000*	*-2,750,000*	*-3,850,000*
New Annual Toll Bridge Trips	*55,000,000*	*55,330,000*	*52,580,000*	*52,250,000*	*51,150,000*
New Annual Toll Revenue:	$ 55,000,000	$ 55,330,000	$ 65,725,000	$ 65,312,500	$ 69,052,500
Change in Annual Transit Trips - Toll Corr.:	*0*	*-417,900*	*1,671,600*	*2,089,500*	*2,925,300*
New Annual Transit Trips - Toll Corr.:	*13,930,000*	*13,512,100*	*15,601,600*	*16,019,500*	*16,855,300*
Change in Annual Transit Trips - Overall:	*0*	*-2,100,000*	*-10,500*	*2,089,500*	*2,925,300*
New Annual Transit Trips - Overall:	*70,000,000*	*67,900,000*	*69,989,500*	*72,089,500*	*72,925,300*
New Annual Transit Revenue - Overall:	$ 70,000,000	$ 74,690,000	$ 76,988,450	$ 72,089,500	$ 72,925,300
Change in Annual Toll Revenue	**$ -**	**$ 330,000**	**$ 10,725,000**	**$ 10,312,500**	**$ 14,052,500**
Change in Annual Transit Revenue	**$ -**	**$ 4,690,000**	**$ 6,988,450**	**$ 2,089,500**	**$ 2,925,300**
"Excess" Toll Revenue (above $1.25 toll):	$ -	$ -	$ -	$ -	$ 3,740,000
Total Increase in Revenue to Transit:	$ -	$ 4,690,000	$ 6,988,450	$ 2,089,500	$ 6,665,300

ELASTICITIES TABLE	*% Change in Transit Demand*	*% Change in Auto Demand*
1% Change in Transit Fare =>	**-0.30**	**0.06**
1% Change in Auto Cost =>	**0.60**	**-0.20**

TABLE C-3 Ridership and revenue impacts of intermodal pricing strategy, scenario 1

The steps outlined below represent a standard format for guaging the ridership and revenue implications of implementing an intermodal pricing strategy between a toll bridge and complementary transit service, using estimated demand elasticities.

Scenario Description:	Raise MGTA fares from $1.00 to $1.25 throughout the day systemwide. Use incremental increase in revenues to offset loss of state operating assistance.
Initiating Agency:	Metropolitan Gotham Transit Authority (MGTA)

Mode:	***Transit***	***Automobile***
Facility/Responsible Agency:	Bus and Rail System / MGTA	Wayne River Toll Bridge / GTA
Identify Current Conditions		
Annual Trips Overall.	70,000,000 trips	
Annual Trips in Toll Corridor:	13,930,000 trips	55,000,000 vehicles
Fare/Toll	$1.00 (per passenger)	$1.00 (per vehicle)
Annual Revenue from Toll Corr.:	$13,930,000	$55,000,000
Annual Revenue Overall:	$70,000,000	
Describe Proposed Changes		
New Peak Fare/Auto Cost:	$1.10 (per passenger)	$1.00 (per vehicle)
Percent Change (average):	10.0%	0.0%

Select Appropriate Elasticity/Cross-Elasticity

	% Change in Transit Demand	*% Change in Automobile Demand*
1% Change in Transit Fare =>	**-0.30** (average)	**0.06** (rail travel)
1% Change in Auto Cost =>	**0.20** (estimate)	**-0.20** (tolls)

Perform Calculations

	10.0% Change in Transit Fare	=>	-3.0% Change in Transit Demand
	10.0% Change in Transit Fare	=>	0.6% Change in Auto Demand
	0.0% Change in Auto Cost	=>	0.0% Change in Transit Demand
	0.0% Change in Auto Cost	=>	0.0% Change in Auto Demand

Identify Impacts

Change in Annual Toll Corr. Trip	-417,900 trips	330,000 vehicles
New Annual Trips in Toll Corr.:	13,512,100 trips	55,330,000 vehicles
Change in Annual Trips Overall	-2,100,000 trips	
New Annual Trips Overall:	67,900,000 trips	
New Annual Revenue Overall	$74,690,000	$55,330,000
Change in Annual Revenue:	**$4,690,000**	**$330,000**

TABLE C-4 Ridership and revenue impacts of intermodal pricing strategy, scenario 2

The steps outlined below represent a standard format for guaging the ridership and revenue implications of implementing an intermodal pricing strategy between a toll bridge and complementary transit service, using estimated demand elasticities.

Scenario Description: Raise toll on Wayne Bridge from $1.00 to $1.25 throughout the day and raise transit fares from $1.00 to $1.10 systemwide.

Initiating Agency: Gotham Metropolitan Planning Organization (GMPO)

Mode:	***Transit***	***Automobile***
Facility/Responsible Agency:	Bus and Rail System / MGTA	Wayne River Toll Bridge / GTA
Identify Current Conditions		
Annual Trips:	70,000,000 trips	
Annual Trips in Toll Corridor:	13,930,000 trips	55,000,000 vehicles
Fare/Toll	$1.00 (per passenger)	$1.00 (per vehicle)
Annual Revenue from Toll Corr.:	$13,930,000	$55,000,000
Annual Revenue Overall:	$70,000,000	
Describe Proposed Changes		
New Peak Fare/Auto Cost:	$1.10 (per passenger)	$1.25 (per vehicle)
Percent Change (average):	10.0%	25.0%

Select Appropriate Elasticity/Cross-Elasticity

	% Change in Transit Demand	*% Change in Automobile Demand*
1% Change in Transit Fare =>	**-0.30** (average)	**0.06** (rail travel)
1% Change in Auto Cost =>	**0.20** (estimate)	**-0.20** (tolls)

Perform Calculations

10.0%	Change in Transit Fare	=>	-3.0% Change in Transit Demand
10.0%	Change in Transit Fare	=>	0.6% Change in Auto Demand
25.0%	Change in Auto Cost	=>	5.0% Change in Transit Demand
25.0%	Change in Auto Cost	=>	-5.0% Change in Auto Demand

Identify Impacts

Change in Annual Toll Corr. Trip	278,600 trips	-2,420,000 vehicles
New Annual Trips in Toll Corr:	14,208,600 trips	52,580,000 vehicles
Change in Annual Trips Overall.	-1,403,500 trips	
New Annual Trips Overall:	68,596,500 trips	
New Annual Revenue Overall:	$75,456,150	$65,725,000
Change in Annual Revenue:	**$5,456,150**	**$10,725,000**

TABLE C-5 Ridership and revenue impacts of intermodal pricing strategy, scenario 3

The steps outlined below represent a standard format for guaging the ridership and revenue implications of implementing an intermodal pricing strategy between a toll bridge and complementary transit service, using estimated demand elasticities.

Scenario Description: Raise toll on Wayne Bridge from $1.00 to $1.35 throughout the day. Transfer incremental increase in toll revenues to MGTA to offset loss of state operating assistance and prevent need for a fare increase.

Initiating Agency: Gotham Metropolitan Planning Organization (GMPO)

Mode:	***Transit***	***Automobile***
Facility/Responsible Agency:	Bus and Rail System / MGTA	Wayne River Toll Bridge / GTA
Identify Current Conditions		
Annual Trips Overall:	70,000,000 trips	
Annual Trips in Toll Corridor:	13,930,000 trips	55,000,000 vehicles
Fare/Toll	$1.00 (per passenger)	$1.00 (per vehicle)
Annual Revenue from Toll Corr.:	$13,930,000	$55,000,000
Annual Revenue Overall:	$70,000,000	
Describe Proposed Changes		
New Peak Fare/Auto Cost:	$1.00 (per passenger)	$1.35 (per vehicle)
Percent Change (average)	0.0%	35.0%

Select Appropriate Elasticity/Cross-Elasticity

	% Change in Transit Demand	*% Change in Automobile Demand*
1% Change in Transit Fare =>	**-0.30** (average)	**0.06** (rail travel)
1% Change in Auto Cost =>	**0.20** (estimate)	**-0.20** (tolls)

Perform Calculations

0.0%	Change in Transit Fare	=>	0.0% Change in Transit Demand
0.0%	Change in Transit Fare	=>	0.0% Change in Auto Demand
35.0%	Change in Auto Cost	=>	7.0% Change in Transit Demand
35.0%	Change in Auto Cost	=>	-7.0% Change in Auto Demand

Identify Impacts		
Change in Annual Toll Corr Trip	975,100 trips	-3,850,000 vehicles
New Annual Trips in Toll Corr :	14,905,100 trips	51,150,000 vehicles
Change in Annual Trips Overall	975,100 trips	
New Annual Trips Overall:	70,975,100 trips	
New Annual Revenue Overall:	$70,975,100	$69,052,500
Change in Annual Revenue:	$975,100	**$14,052,500**

"Excess" Toll Revenue (above $1.25 "base case" toll): **$3,740,000**
Total Increase in Revenue to Transit: **$4,715,100**

"Base Case" Impacts (transit = $1.00, toll = $1.25)		
Change in Annual Toll Corr. Trip	696,500 trips	-2,750,000 vehicles
New Annual Trips in Toll Corr :	14,626,500 trips	52,250,000 vehicles
Change in Annual Trips Overall:	696,500 trips	
New Annual Trips Overall:	70,696,500 trips	
New Annual Revenue Overall:	$70,696,500	$65,312,500
Change in Annual Revenue:	$696,500	**$10,312,500**

"surcharge" (in order to establish a "base" revenue level for GTA-see the bottom of Table C-5.) This pricing strategy netted a $10.3 million "base" increase in revenues for the GTA. It is also interesting to note that this increase in auto costs alone resulted in a projected diversion of 0.7 to 2.1 million annual passengers to transit, and a corresponding revenue increase of $0.7 to $2.1 million (depending on which cross elasticity of transit use with respect to auto cost was applied). The worksheet calculations were then performed for a $1.35 toll with no fare increase, yielding a $14.1 million increase in toll revenues, 3.9 million fewer vehicles contributing to congestion per year, and between 1.0 and 3.0 million more transit riders annually. Applying the $3.7 million in "surcharge" revenues to the fare revenue from the increased transit patronage yielded a projected increase in transit revenue of $4.7 to $6.7 million, depending on which cross elasticity of transit use with respect to auto cost was applied (see Table C-5).

Scenario 3, the toll "surcharge" strategy, yielded the best results with respect to Gotham City regional transportation and air quality goals by increasing MGTA ridership and reducing traffic congestion on the Wayne River toll bridge to the greatest extent.

C.4 CONCLUSIONS

Although this analysis shows the potential for integrating transportation pricing strategies between modes by applying a "transit surcharge" to a congested toll facility, the toll increase/fare increase pricing strategy (Scenario 2) also illustrates how a less extensive degree of coordination-raising fares and tolls at the same time-can help offset net transit ridership losses and further enhance revenue. Raising tolls in a particular corridor and applying the proceeds to the entire transit service area (as was intended with this particular "transit surcharge") raises equity implications with regard to the people who pay the surcharge and the people who are able to benefit from it. Ideally, a coordinated intermodal pricing strategy would take place on a regionwide basis, but short of that, equity concerns need to be addressed explicitly from the outset of intermodal pricing strategy considerations. It is also important to emphasize the influence of the chosen demand elasticities and cross-elasticities on the projected travel behavior. These elasticities are often based on limited empirical data or on assumptions regarding the characteristics of commuter behavior in a particular locality. Care must be taken to estimate mode usage and revenue impacts conservatively until experience with intermodal pricing strategies has provided more accurate local data for estimating travel behavior impacts.

These **Digests** are issued in the interest of providing an early awareness of the research results emanating from projects in the TCRP. By making these results known as they are developed, it is hoped that the potential users of the research findings will be encouraged toward their early implementation. Persons wanting to pursue the project subject matter in greater depth may do so through contact with the Cooperative Research Programs Staff, Transportation Research Board, 2101 Constitution Ave, N.W., Washington, DC 20418.

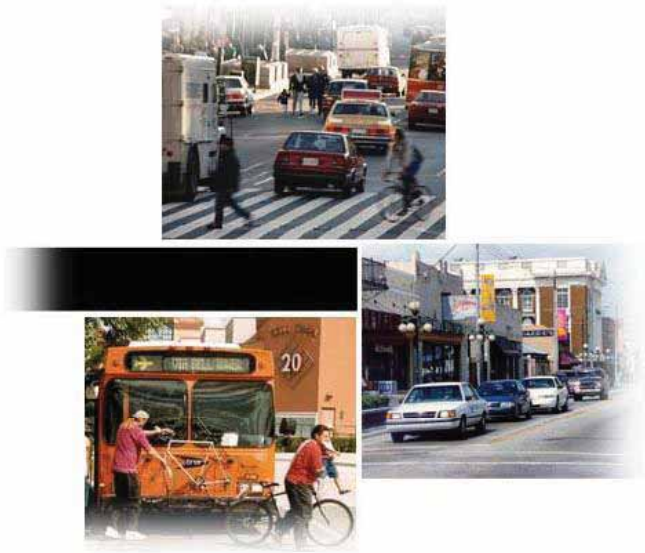
TRANSPORTATION RESEARCH BOARD
National Research Council
2101 Constitution Avenue, N.W.
Washington, DC 20418

Model Regulations and Plan Amendments for Multimodal Transportation Districts

National Center for Transit Research
April 2004

Final Report
FDOT Contract Number: BC-137-47

Model Regulations and Plan Amendments for Multimodal Transportation Districts



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April 2004

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The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the U.S. Department of Transportation or the State of Florida Department of Transportation.

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16. Abstract In 1999, the Florida legislature enabled local governments to establish Multimodal Transportation Districts [MMTD) in their comprehensive plan as a means of promoting a high quality multimodal environment within selected urban areas. The Florida Department of Transportation and its partners have engaged in several projects to support a more multimodal approach to transportation and development planning. These efforts have included development of multimodal level of service standards, as well as procedures for determining multimodal level of service and concurrency. This project builds on that work by providing model comprehensive plan amendments and land development regulations to assist local governments in implementing multimodal transportation districts, where priority is placed on walking, bicycling and transit use through a coordinated package of land use and transportation strategies.			
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PART I: INTRODUCTION

In 1999, the Florida legislature amended Chapter 163, Florida Statutes, commonly known as the Growth Management Act, authorizing local governments to establish multimodal transportation districts. The purpose of the legislation was to provide a planning tool that Florida communities could use to systematically reinforce community design elements that support walking, bicycling and transit use. It also enabled Florida communities to advance transportation concurrency—a policy requirement that transportation facilities be available concurrent with the impacts of development—through development of a high quality multimodal environment, rather than the typical approach involving road widening for automobile capacity.

Multimodal transportation districts (MMTDs) are to be carried out through local comprehensive plans, land development regulations, and capital improvements programs. This report provides model comprehensive plan amendments and model regulations for multimodal transportation districts to assist local governments in Florida. It is based on a national review of multimodal policies, ordinances, and practices at the local level and a synthesis of best practices. The report begins with an overview of the purpose and statutory requirements for multimodal transportation districts in Florida, and continues with model comprehensive plan amendments and land development regulations to assist local governments in implementing MMTDs.

What is a Multimodal Transportation District?

A multimodal transportation district is an area where primary priority is placed on "assuring a safe, comfortable, and attractive pedestrian environment, with convenient interconnection to transit" (*1*). Communities must incorporate community design features that reduce vehicular usage while supporting an integrated multimodal transportation system. Common elements include the presence of mixed-use activity centers, connectivity of streets and land uses, transit-friendly design features, and accessibility to alternative modes of transportation.

The Florida Department of Transportation has developed a *Multimodal Transportation Districts and Areawide Quality of Service Handbook* (FDOT 2004) to provide guidance on the designation and planning of MMTDs as provided in Florida's growth management legislation. The handbook provides for MMTD designation in a downtown or urban core area, regional activity center, or traditional town or village in accordance with certain criteria. In these areas, planning efforts would focus on enhancing multimodal elements, guiding redevelopment, and encouraging appropriate infill. An MMTD could also be applied to a new or emerging area, where adopted plans and regulations would need to ensure the internal and external connectivity, a mix of uses, densities, and urban design features necessary to support alternative modes of transportation.

Why Establish an MMTD?

Establishing a successful MMTD can provide many benefits to a community and its residents. The MMTD provides an alternative to the typical disconnected, auto-dependent developments that are commonly seen throughout Florida. Shortened distances between work, home, and shopping areas promote walking and bicycling; greater emphasis on transit boosts ridership; and increased pedestrian activity heightens security. With automobile dependency reduced, expenditures that would otherwise be dedicated to building and widening

major roads can be used for sidewalks, bicycle routes, transit facilities and other improvements aimed at supporting alternative modes of transportation.

The new legislation also allows local governments in Florida to use alternative approaches to concurrency determinations (Chapter 163.3180(15)(d), F.S.). Typically, minimum level of service standards are established in local comprehensive plans based solely on automobile usage. In an MMTD, concurrency determinations may be based on multimodal performance measures that consider all of the available modes of transportation, including walking, biking, and transit.

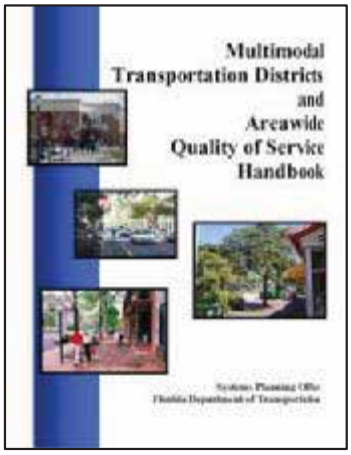
Where minimum automobile level of service standards are exceeded by proposed developments, "local governments may issue development permits in reliance upon all planned community design capital improvements that are financially feasible over the development or redevelopment timeframe, without regard to the period of time between development or redevelopment and the scheduled construction of capital improvements" (*2*). This statement provides considerable flexibility in accomplishing concurrency, while allowing the intensity and type of development necessary to support multimodal objectives.

Planning & Implementation

MMTD designation is accomplished by amending a local government comprehensive plan and accompanying future land use map, as provided in Chapter 163.3184, F.S. A proposed multimodal transportation district must be reviewed and approved by both the Department of Community Affairs (DCA) and the Florida Department of Transportation (FDOT). Local governments must demonstrate that an area qualifies as an MMTD based upon the following existing or planned future design elements defined in Chapter 163.3180(15)(b), F.S.:

- A complementary mix and range of land uses;
- An interconnected network of streets to encourage walking and bicycling, with traffic calming where desirable;
- Appropriate densities and intensities of use within walking distance of transit stops;
- Daily activities within walking distance of residences, allowing independence to persons who do not drive;
- Public uses, streets, and squares that are safe, comfortable, and attractive for the pedestrian, with adjoining buildings open to the street and with parking not interfering with pedestrian, transit, automobile, and truck travel modes.

Communities considering designating an MMTD are encouraged to review the FDOT *Multimodal Transportation Districts and Areawide Quality of Service Handbook* (Multimodal Handbook) and to contact the Florida Department of Transportation (FDOT) and the Department of Community Affairs (DCA) early in the process for guidance. The Handbook provides guidelines for local governments to achieve the successful designation of an MMTD. The guidelines are also used in assessing the success of a district by FDOT and DCA.



The FDOT *Multimodal Handbook* characterizes a "good candidate" as having "a mix of mutually supporting land uses, good multimodal access and connectivity, an interconnected

transportation network and the provision of alternative modes of transportation to the automobile" (*3*). Although certain elements are required for designation, many of the *Multimodal Handbook s* guidelines are recommendations and not rigid standards or thresholds. Flexibility is provided during the review process for proposed districts that fail to meet all applicable standards.

After the plan is amended, consistent local ordinances must be adopted to implement the new district. Local governments could elect to amend existing land development regulations either through an overlay zone, which adds new regulations onto the underlying zoning district(s), or a special district with new design standards and regulations that are tailored to the MMTD.

Table 1: Basic Criteria for a Multimodal Transportation District

Land Use	• Be of sufficient size to support uses and transportation alternatives • Contain a variety of land uses, including both employment and residential • Include land uses promoting pedestrian, bicycle, and transit use
Appropriate Density and Intensity of Land Uses	• Sufficient densities to demonstrate transit ridership • Sufficient intensities in and around central cores • Sufficient intensity along major transit corridors
Interconnected Street System	• Adequate levels of service for bicyclists, pedestrians, and transit • Appropriate numbers of connections within the street network • Connected pedestrian, bicycle, and transit network • Convenient modal connections • Convenient connections to regional transportation
Design	• Adequate access for pedestrians and cyclists to transit • Transit oriented development within the area • Shorter block length providing easier access and better quality pedestrian environment
Additional Considerations	• Special considerations given to schools and their multimodal needs to provide a safe, accessible environment for students • Reduction in vehicle miles of travel within the district • Determination of impacts on any FIHS facility

Source: (*3*).

Given the many objectives of MMTDs, it is advisable to prepare a subarea plan for each district. Subarea plans, also known in Florida as select area plans, are detailed development plans for a specific geographic area. They are generally developed with oversight of an advisory group that represents area stakeholders, and may focus on a particular neighborhood, commercial district, or high growth area.

The subarea planning process is an opportunity to carefully evaluate the characteristics of a district. The FDOT *Community Impact Assessment Handbook* explains how to evaluate the transportation needs of an area and the potential impacts of proposed plans on the community and its quality of life (*4*). The process begins with the development of a community profile to provide a baseline for understanding community mobility needs and issues. This process includes the following steps:

- Review social and economic characteristics including demographics, growth trends, labor force, major employers and housing;
- Identify community issues and attitudes through a review of secondary sources, talk with knowledgeable persons, visits to the community and interviews with stakeholders;
- Inventory study area features including community facilities & services, existing businesses, land use characteristics, transportation characteristics, and aesthetic and cultural resources;
- Summarize findings in a written report including a socio-economic inventory map.

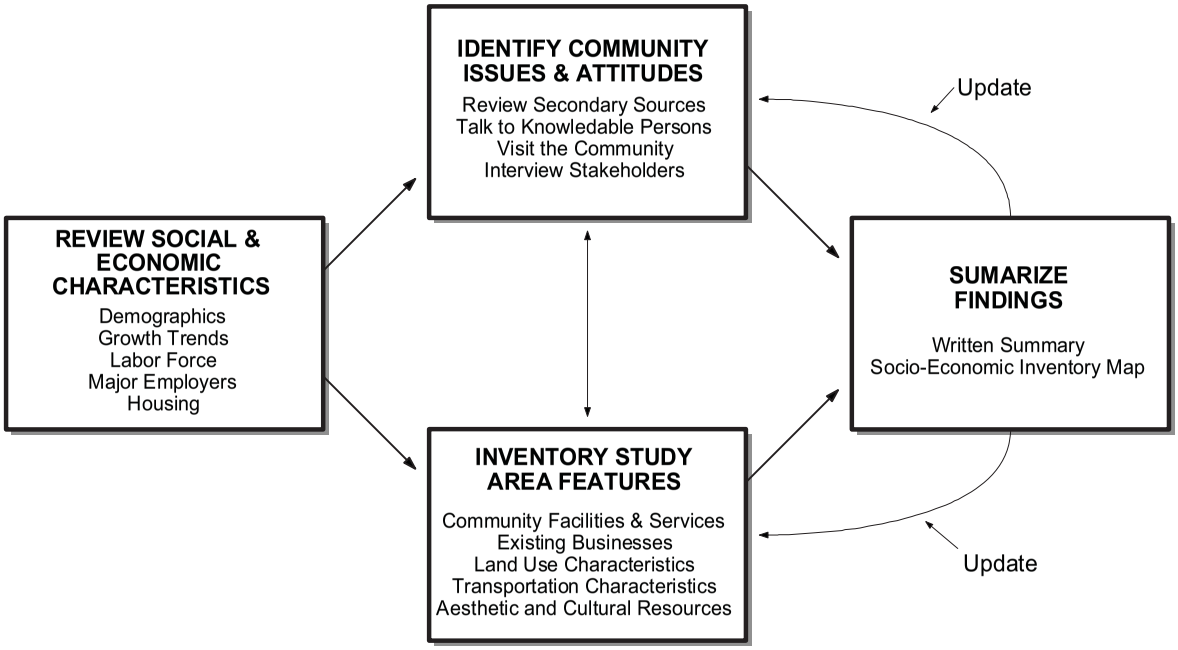


Figure 1: Process for developing a community profile (*4*).

The community profile can be used to develop an effective long term plan for the MMTD by enhancing agency understanding of community needs and attitudes, as well as the potential social and economic impacts of various planned alternatives. For example, a community profile might reveal special needs for upgrading pedestrian facilities and crossings in certain areas, extending or modifying transit routes, enhancing street and intermodal connectivity, preserving community facilities or cultural and historic resources, and so on. From there, effective strategies can be developed for reducing or avoiding potential adverse impacts of the plan and maximizing mobility benefits.

The optional sector plan approach, created by the 1998 Florida Legislature as a pilot program in four Florida counties(Section 163.3245(6), F.S.), offers another potential opportunity for planning and implementing MMTDs (*5*). The program was enacted as a means for preparing a conceptual, long-term build-out overlay, and detailed specific area plans for areas of 5000 acres or more. The statute waives the development of regional impact process for approved local sector plans and requires an emphasis on urban form and the protection of regional resources and facilities. Should this program be extended for statewide use, it could be an effective means of creating a multimodal transportation district in emerging or undeveloped areas.

The Importance of Incentives

Infill costs in urban areas can be an impediment to accomplishing the density and mix of uses that are necessary for a successful multimodal district. Statutory language encourages local governments to offer financial incentives, such as reduced impact fees, to offset the high costs of urban infill and redevelopment within an MMTD. Communities can reduce impact fees for development according to the reduction of vehicle trips per household or vehicle miles of travel expected from the development pattern planned for the district.

One area that varies transportation impact fees to reinforce alternative modes of transportation is the City of Bellevue, Washington. Bellevue varies impact fees depending upon the location and type of development (sometimes as much as 100%), with much lower fees in the downtown area based on its high level of transit service (*6*). Florida communities could also look to the City of Portland, Oregon for an example of how impact fee programs could be structured to advance multimodal transportation objectives. Portland discounts impact fees (called system development charges or SDCs) for "transit-oriented" developments and also applies SDC revenues to transportation capital improvement projects that advance multimodal transportation objectives over a 10-year period (*7*). Qualifying criteria for eligibility for SDC expenditures of relevance to MMTDs include:

- accommodates increased density and/or in-fill re/development,
- reduces reliance on automobile usage by increasing access to alternate modes of travel,
- improves transit connections between employment centers and neighborhoods, and
- limits impacts of motor vehicles on pedestrian, bike, and transit-oriented areas.

Other incentives that can be explored are community redevelopment areas/tax increment financing districts and publicly funded improvements to area infrastructure and streetscapes. In addition, some states, including Rhode Island, New Jersey, and Maryland, have enacted Rehab Codes as a means of reducing costs associated with revitalizing older buildings in urbanized areas. Rhode Island's Rehab Code, which went into effect in May 2002, is a streamlined and user-friendly document that reduces the time, expense and unpredictability of revitalizing older buildings for residential, commercial and industrial uses (*8*).

The Puget Sound Regional Council also notes the following effective incentives for transit-oriented developments (*6*):

- Density bonuses for projects that include a certain percentage of affordable housing units. In this way, communities can help preserve affordable housing alternatives and socio-economic diversity in multimodal districts, given the tendency of such areas to gentrify with a corresponding increase in housing prices.
- Expedited development applications in exchange for density. Fast-tracking permits can help offset the high costs of infill and also help promote densification where it is desired. So often, projects that increase density have the opposite problem – permitting delays due to controversy over higher densities.

The model land development regulations in this report offer traffic impact fee offsets of varying degrees. Such offsets could be tailored to promote specific planning objectives for the MMTD. Expedited review is also offered for development proposals that advance multimodal goals within an MMTD.

Monitoring

Monitoring the progress of an MMTD occurs biennially through a cooperative effort between DCA, a local government and technical assistance provided by FDOT (*3*). These reviews and reports also serve as an aide to other communities that may participate in the MMTD program. Local governments can also internally monitor the success of an MMTD by establishing performance targets that should be achieved within an MMTD by a specific planning horizon.

Recommended performance targets are provided on page 43 of the *Multimodal Handbook* as follows:

Table 2: Recommended Performance Targets for Multimodal Transportation Districts

	PEDESTRIAN	TRANSIT	BICYCLE	AUTOMOBILE
TRANSIT-ORIENTED	C	C	D	FIHS/LGCP*
NON-MOTORIZED ORIENTED	C	D	C	FIHS/LGCP*

**LOS standards for facilities on the Florida Intrastate Highway System (FIHS) are established by the FDOT. LOS standards for all other roadways are established in (refer to appropriate section) of the local government comprehensive plan (LGCP).*

Source: (*3*).

The *Multimodal Handbook* also includes performance measures aimed at accomplishing specific multimodal objectives to guide development in the District. These are as follows:

- 80% of all facilities contained in bicycle and pedestrian networks function at LOS C or better,
- All parcels within ¼ mile of a transit stop should be served by pedestrian facilities operating at LOS C or better,
- 80% of employees and dwelling units in a district will be located within ½ mile of a transit stop.

Communities could establish a variety of other performance measures specific to the needs of a particular area for use in monitoring progress and guiding development towards desired outcomes. In reality, monitoring will need to occur continuously in response to development requests, to assure that the desired objectives of the MMTD are being met. In addition, the Evaluation and Appraisal process for comprehensive plans, which local governments in Florida must conduct every seven years, offers a formal opportunity to evaluate progress toward meeting MMTD objectives. The Evaluation and Appraisal report is intended to measure a community's progress in addressing major community land use planning issues through implementation of its comprehensive plan. Based on this evaluation, the report could suggest ways the MMTD should be revised to better accomplish multimodal objectives and to address changing conditions and trends.

PART II: MODEL COMPREHENSIVE PLAN AMENDMENTS

Introduction

The following model language is intended as a guide for developing a local comprehensive plan amendment for multimodal transportation districts. The language is tailored specifically for Multimodal Transportation District(s) as they are defined in Florida law, but several of the policies could also be modified for broader application. References that appear between brackets [ ] in italics must be filled in by the local government.

Multimodal Transportation Districts

Objective. Establish multimodal transportation districts (MMTD) within the community where secondary priority is placed on vehicle mobility and primary priority is placed on providing a safe, comfortable and attractive environment for pedestrians and bicyclists with convenient access to transit, thereby encouraging the use of multiple modes of transportation and leading to a reduction in automobile use and vehicle miles traveled.

Policy 1. Designation Criteria. Existing areas with multimodal characteristics or proposed new multimodal developments (e.g. traditional neighborhood developments) may be designated as a Multimodal Transportation District (MMTD) in accordance with the following criteria.

1. **Type of MMTD**. An existing area or development plan may qualify for designation as an Urban Center, Regional Center, or Traditional Town/Village MMTD provided it generally conforms with the characteristics of that category as specified below and in Table 3:

    a. **Urban Center**. The Urban Center MMTD shall be characterized by intense development and major employment supported by residential uses that produce a significant amount of multimodal activity because walking, bicycling, and transit are more convenient than using the automobile. This category is typically reserved for existing urban core or downtown areas.

URBAN CENTERS

Downtown Miami

Source: (*3*).

REGIONAL CENTER

Miami Beach

Source: (*3*).

b. **Regional Center**. The Regional Center MMTD shall be characterized by a significant area of development that is smaller than an Urban Center and provides convenient daily retail and personal service within walking distance of surrounding residential areas. This category is typically most appropriate for new town developments and existing activity centers other than urban core areas.

c. **Traditional Town or Village**. The Traditional Town MMTD shall be characterized as a traditional "Main Street" community organized around a focal point with a sense of community identity. This category is typically applied to historic neighborhoods or smaller town environments with a main street.

TOWN OR VILLAGE

Source: (*3*).

Table 3: Multimodal Transportation District Characteristics

	URBAN CENTER	REGIONAL CENTER	TRADITIONAL TOWN OR VILLAGE
POPULATION	> 50,000	25,000 50,000	< 25,000
JOBS	> 50,000	> 5,000	< 5,000
AREA	10 square miles	5 square miles	2 square miles
COMPACT CORE	Community and commercial services	Community and commercial services	Community services
DENSITY	High	Mid- to High	Mid

Source: (*3*).

2. **Financial Feasibility**. MMTDs shall only be approved in conjunction with the approval of financially feasible plans for bicycle, pedestrian and transit systems that reduce reliance on automobiles for access and internal circulation.

3. **Preservation of FIHS**. Proposed MMTDs shall not significantly degrade the adopted level of service standards for facilities designated as part of the Florida Intrastate Highway System.

4. **Required Design Elements**. Proposed Multimodal Transportation Districts must exhibit the following community design elements, as outlined in F.S. 163.3180(15)(a-d):

   a. An interconnected network of streets and paths designed to encourage walking and bicycle use, with traffic calming where desirable;

b. A complementary mix and range of land uses, including residential, educational, recreational, and cultural;

c. Appropriate densities and intensities of land uses within walking distance of transit stops;

d. Daily activities within walking distance of residences and public uses, streets and squares that are safe, comfortable, and attractive for the pedestrian, with adjoining buildings open to the street and parking designed so as not to interfere with all transportation modes.

Policy 2. Designation of MMTD(s). In accordance with Policy 1, and the provisions of F.S. 163.3180 and the FDOT *Multimodal Transportation Districts and Areawide Quality of Service Handbook* (Multimodal Handbook), the *[local government]* hereby establishes the area(s) in Exhibit XX and identified on the Future Land Use Map as Multimodal Transportation District(s) for the purpose of promoting walking, bicycling and transit use and reducing dependence on the automobile.

> *Commentary: Proposed MMTD designations must be analyzed for conformance with the criteria provided in the FDOT Multimodal Transportation Districts and Areawide Quality of Service Handbook (Multimodal Handbook), and evaluated and approved by the Florida Department of Community Affairs in coordination with the Florida Department of Transportation. The designation criteria in Policy 1 are designed for consistency with F.S. 163.3180 and the Multimodal Handbook.*

Policy 3. Organization of Land Uses. The *[local government]* shall review the Future Land Use Map and land development code in each MMTD and modify them as needed to provide for an appropriate density, intensity and mix of land uses to support multimodal transportation, and specifically to ensure:

a. a strong central core or urban center consisting of government centers, transit stations, or a town square surrounded by relatively high density/intensity residential and non-residential development;

b. a compatible mix of land uses throughout the MMTD and within individual sites and buildings that supports alternative modes of transportation and promotes activity during peak and non-peak hours;

c. proximity of shopping, services, and employment centers to each other and to the surrounding residential uses to facilitate walking and bicycling, as an alternative to driving.

Policy 4: Relationship to Major Thoroughfares. Multimodal Transportation Districts shall be planned in a manner that maximizes internal circulation and minimizes conflicts on the Florida Intrastate Highway System (FIHS) and other major arterial roadways which have the primary function of moving high volumes of statewide and regional traffic. Where such roadways are included in a Multimodal Transportation District, a minimum of two (2) safe pedestrian crossings shall be provided per mile.

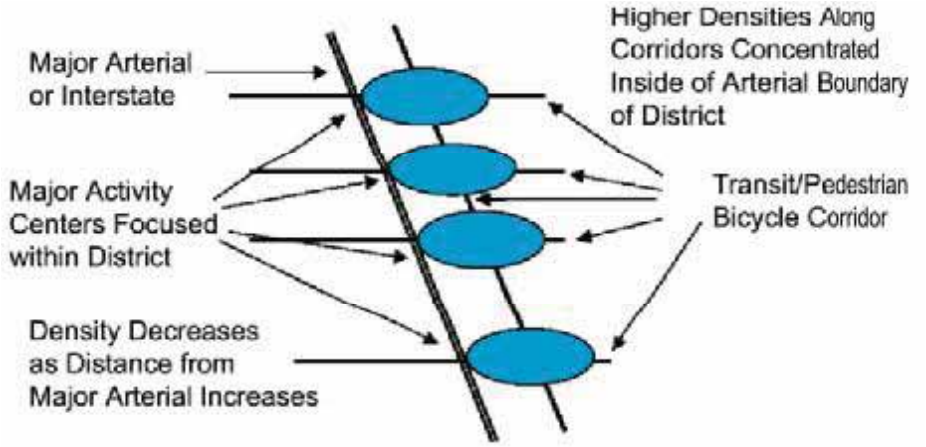


Figure 2: Recommended Location of Activity Centers Along Major Arterial Corridors (3).

Commentary: Major roadways can have a barrier effect on a multimodal district. Conversely, multimodal activity centers can cause unsafe conflicts between transportation modes, inadequate corner clearance of access points, and other safety and operational problems if they are not carefully planned and located. It is best to avoid placing activity centers so they straddle major roadway intersections. Orienting vehicular access and circulation systems away from a major arterial and onto minor roadways protects and reinforces alternative modes of transportation. Alternative modes and intermodal connections should be provided on the arterial in a manner that preserves through traffic movement. For example, consider providing bus rapid transit service on major arterials to connect activity centers. Locate transit station areas and pedestrian crossings in strategic locations so they are coordinated with the overall signal timing plan. Bus stops could be located downstream of signalized intersections to avoid conflicts with queuing and turning traffic at the road intersection. See the national Access Management Manual for further information on access management and development planning.

Policy 5: Transportation Quality/Level of Service.

1. The *[local government]* shall coordinate with the *[local transit agency]* and the MPO to apply the transit quality of service framework as found in the Second Edition of the *Transit Capacity and Quality of Service Manual* (TCQSM) and required as part of the MPO's long-range transportation plan.
2. *[Local government]* establishes the following minimum quality/level of service standards and performance targets for transit, bicycle and pedestrian facilities and roadways within the MMTD(s) shall be as follows:
   a. 80% of all the bicycle and pedestrian facilities within the MMTD network shall function at LOS C or better;
   b. All parcels within ¼ mile of a transit stop should be served by pedestrian facilities operating at LOS C or better;
   c. 80% of the employees and dwelling units in a district will be located within ½ mile of a transit stop.

Table 4: Minimum LOS Standards for Multimodal Transportation Districts

	PEDESTRIAN	TRANSIT	BICYCLE	AUTOMOBILE
TRANSIT-ORIENTED	C	C	D	FIHS/LGCP*
NON-MOTORIZED ORIENTED	C	D	C	FIHS/LGCP*

**LOS standards for facilities on the Florida Intrastate Highway System (FIHS) are established by the FDOT. LOS standards for all other roadways are established in (refer to appropriate section) of the local government comprehensive plan (LGCP).*

Source: (*3*).

Commentary: The Areawide Quality of Service for transit, bicycle and pedestrian facilities within each MMTD can be measured in accordance with the methodology established in the Multimodal Handbook.

Policy 6: Transportation Concurrency. Transportation concurrency in the MMTD shall be evaluated based upon a financially feasible long-range capital improvements plan and program for the district, without regard to the period of time between development or redevelopment and the scheduled construction of the capital improvements.

Commentary: Rule 9J-5.0055(3)(c)7 provides that a development order or permit within a designated multimodal transportation district may be issued provided the planned community design capital improvements are included in a financially feasible long range schedule of improvements for the development or redevelopment time-frame for the district, without regard to the period of time between development or redevelopment and the scheduled construction of the capital improvements, as specified in Section 163.3180(15)(c), F.S.

Policy 7: Multimodal Street Design and Operation. The *[local government]* shall establish multimodal street cross-sections, design standards, and operational measures (e.g. pre-emptive signals, dedicated bus lanes, etc.) to ensure streets are safe, convenient and appealing for all modes of travel, including transit, automobiles, trucks, bicycles and pedestrians. Strategies shall include marked crosswalks, wider sidewalks, on-street parking, bus turnouts, traffic calming, raised medians, adequate drainage or other appropriate safety enhancements that reduce hazardous conflicts between modes and that are consistent with the planned functions of the roadway.

Commentary: Plans for new or reconstructed streets under the jurisdiction of the FDOT should be reviewed by the local government, the local transit agency, the bicycle pedestrian coordinator and any standing committees or other interested parties for compliance with the intent of the MMTD and other multi-modal plans.

Policy 8: Street Network and Connectivity. MMTDs shall provide a dense, interconnected network of local and collector streets that supports walking, bicycling and transit use, while avoiding excessive through traffic in residential neighborhoods, in accordance with the following:

a. The street network shall be comprised of a system of interconnected and direct routes with a connectivity index of 50 or more polygons per square mile as measured in the Multimodal Handbook.

b. For MMTDs with a street connectivity index below 50, the missing links in the street network shall be identified and eliminated where feasible through the development and capital improvement process.

c. Each MMTD shall be subject to a maximum block (length or perimeter) requirement to advance connectivity as development and redevelopment occurs.

d. Connections of new local and collector streets and driveways with arterial streets shall conform to adopted access spacing intervals of the agency with jurisdiction.

e. The local street circulation pattern shall maximize access to individual lots and activity center destinations (e.g. schools, commercial areas, parks). At the same time, the circulation pattern shall discourage cut-through traffic in residential areas through designs such as curving roads, jogs, T-intersections, roundabouts, gateway treatments, and traffic calming techniques (e.g. chicanes, speed tables, raised intersections, on-street parking, etc).

Commentary: A maximum block length requirement ranging from 245-660 feet could be established in code, depending upon the access management needs of the affected primary or secondary roadway. Maximum block perimeter standards (e.g. 1320 feet) may be preferred as these can provide more flexibility to accommodate variations in terrain and existing buildings or barriers. The model regulations in Part III of this report call for a maximum 660 ft. block length, with exceptions for specified conditions, and include a requirement for a 20-foot wide bicycle/pedestrian easement to pass through blocks in excess of 660 feet in length.

Policy 9: Bicycle/Pedestrian Network and Connectivity. MMTDs shall provide direct bicycle and pedestrian connections within and between residential areas and supporting community facilities and services, such as shopping areas, employment centers, transit stops, neighborhood parks, and schools. The following criteria shall also apply:

a. The bicycle and pedestrian network shall each be comprised of a system of interconnected and direct routes with a connectivity index of 50 or more polygons per square mile as measured in the Multimodal Handbook.

b. For MMTDs with a connectivity index below 50, the missing links or gaps in the bicycle and pedestrian network shall be identified and eliminated where appropriate through the development and capital improvement process. Missing links may include locations between cul-de-sacs, through walls or fences, mid-block where block length exceeds 660 feet, or where bicycle pedestrian routes would otherwise be "excessively" circuitous.

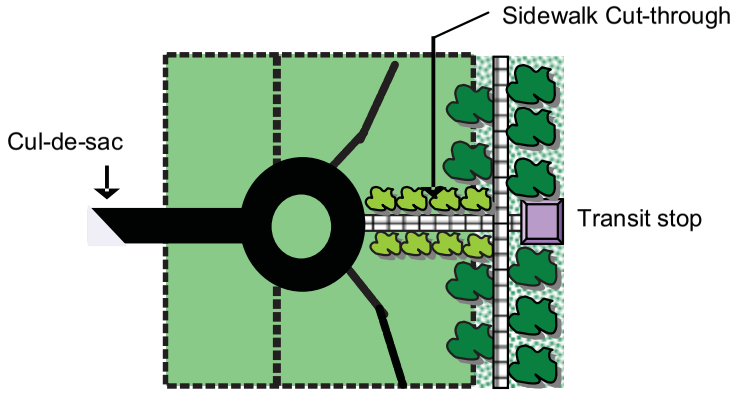


Figure 3: Pedestrian Cut-Through from Cul-De-Sac to Transit Stop Along Arterial Street.

c. Highest priority for improvements shall be given to locations with high concentrations of pedestrian activity and where connections are needed to ensure easy access between transportation modes, with particular attention to bicycle and pedestrian access to schools, transit stops and regional greenway or trail systems.

Example of Pedestrian Access from a Sidewalk to a Parking Lot.

Commentary: It is helpful to set a benchmark for eliminating existing deficiencies, such as eliminate at least one (1) linear mile of gaps in the bicycle and pedestrian facilities network each year. In addition, request the input of the local bicycle and pedestrian coordinator and bicycle and pedestrian advisory committee on appropriate bicycle and pedestrian facilities throughout project planning for new roadway construction or reconstruction. Another way to encourage bicycle use within the MMTD is to distribute bicycle maps with the location of routes, parking areas, transit interfaces, streets to avoid and safety tips.

Policy 10: Consideration for Schools. The *[local government]* shall give special consideration to schools and their multimodal needs to provide a safe, accessible environment for students by giving high priority to bicycle and pedestrian facilities within a two-mile radius of all schools in both new development and redevelopment.

Commentary: The Safe Ways to School program offers detailed information for consideration. Local governments may want to establish higher multi-modal level-of-service standards for bicycle and pedestrian modes on primary routes leading to schools.

Policy 11: Consideration for Demographics. Special consideration shall be given to areas with concentrations of students, seniors, low-income families or others that are more dependent on modes other than the automobile to provide a safe, accessible environment.

Policy 12: Contributions to Multimodal Network. New developments or redevelopment projects shall contribute to providing a safe, convenient, comfortable and aesthetically pleasing transportation environment that promotes walking, cycling, and transit use. Appropriate improvements or enhancements to the multimodal network may be required as a condition of development approval, such as the following:

- Full accommodations for pedestrian access and movement, including shaded sidewalks, benches and enhanced crossings;
- Full accommodations for bicycles, including lockers, showers, and racks;
- Direct connections between the MMTD and the regional bicycle/pedestrian network;

- Installation of shared use paths in accordance with the FDOT *Bicycle Facilities Planning and Design Guidelines Handbook;*

Commentary: The FDOT Bicycle Facilities Planning and Design Guidelines Handbook (Revised April 2000) defines a shared use path as a bikeway physically separated from the motorized vehicular traffic by an open space or barrier and wither within highway right of way or within an independent alignment. Shared use paths will be used by pedestrians, skaters, and joggers as well as bicyclists.

- Well-designed accommodations for transfer of passengers at designated transit facilities;
- Preferential parking for rideshare participants;
- Well designed access for motor vehicle passenger drop-offs and pick-ups at designated transit facilities and at commercial and office development sites;
- Full accommodation for the mobility impaired, including parking spaces, sidewalks and ramps for handicapped access;
- Weather protection at transit stops.

Policy 13: Transit. The *[local government]* shall work with the *[local transit agency]* to ensure that the MMTD is well-connected via transit to major trip generators and attractors both inside and outside of the MMTD, that transit stops and waiting areas are safe and comfortable, and to enhance intermodal connections.

a. Identified needs shall be reflected in the *[transit development plan (TDP)]* and/or the *[local government]* capital improvements program and priority shall be given to funding of improvements that increase the availability, speed, frequency, duration and reliability of transit serving the MMTD.

b. The *[local government]* shall coordinate with the *[local transit agency]* regarding the provision of transit centers, super stops, and other facilities for the transfer of passengers to and from the MMTD via the regional transit system.

c. The *[local government]* shall coordinate with the *[local transit agency]* regarding the provision of benches, signage, lights, and covered or enclosed waiting areas for transit stops within the MMTD.

d. The *[local government]* shall coordinate with *[local transit agency]* regarding the provision of bicycle parking at transit stops and bicycle racks on buses as a means to interface bicycle travel with public transit.

Commentary: Policies 12c, d, and e above were taken from Recommended Transit-Supportive Language and Policies for Local Government Planning Documents by Chandra Foreman, National Center for Transit Research (CUTR 2002). Local governments may want to coordinate with the Metropolitan Planning Organization (MPO) to ensure that the provision of public transportation is considered in lieu of or as part of major transportation construction projects.

Protection should be provided for people and bicycles.

Policy 14: Parking Management. Parking shall be limited to discourage single-occupant vehicle commuting and reinforce non-auto modes, but not so limited as to adversely impact the viability and vitality of the MMTD. Emphasis shall be on short-term parking (e.g. parking duration limits, time-of-day limits, restricted parking zones] over long-term parking in commercial areas.

Transit stop with easy access to surrounding land uses. Source: (*9*).

Policy 15: Limits on Parking. Maximum allowances for off-street parking spaces shall be established in the land development code for land uses within the MMTD and reviewed periodically as conditions change to ensure they continue to adequately address parking needs and the availability of transit or other non-auto modes.

Policy 16: Location and Design of Off-Street Parking. Off-street parking areas shall be located and designed in a manner that supports and does not conflict with pedestrian activity, such as to the side or rear of buildings, and shall be limited in size and scale through strategies such as shared parking, parking credits, and maximum parking limits.

Policy 17: Vehicle Trip Reduction/Transportation Demand Management. Transportation demand management strategies shall be incorporated into the transportation planning process for MMTDs to alleviate congestion. A range of techniques will be considered, such as vanpool/ridesharing programs, parking management, pricing, transit vouchers, pre-tax incentives, telework, flextime, and/or other appropriate trip reduction strategies. The local government will identify and work with other service providers, as appropriate, to implement the selected strategies.

> *Commentary: Some areas have a regional commuter assistance program (CAP) that can assist with the development of a transportation demand management program. In the absence of a CAP, the FDOT commuter assistance program may be contacted for assistance. Local governments could advance TDM by providing matching funds to private initiatives that support TDM, such as employer vanpool programs. This reduces the financial risk to the public in introducing new services, while providing seed money for employers to invest in their own employees commutes by transit, vanpool, carpool, bicycling and walking.*
>
> *The feasibility of establishing a transportation management association (TMA) within the MMTD could also be explored. The TMA is a public-private partnership to address local issues, foster community participation and potentially provide mobility management services. Services may include emergency guaranteed ride home programs, vanpool services, technical assistance to employers , schools and others on trip reduction strategies, circulator services, workshops and programs about safe bicycling, and so on. Funding for the TMA may be accomplished through the creation of a community improvement district, as defined by the geographic boundaries of the MMTD.*

Policy 18: Building Orientation. Buildings shall be oriented to provide pedestrians and bicyclists with easy access and a visually interesting environment that reduces perceived travel distances and increases the legibility of the bicycle and pedestrian network.

Policy 19: Design Guidelines. The *[local government]* shall establish architectural design guidelines appropriate for application in MMTDs by *[specify date]* to ensure that new construction and infill or redevelopment will contribute positively to the character and livability of the MMTD.

Policy 20: Intergovernmental Coordination. The *[local government]* shall coordinate with the Florida Department of Transportation, the local metropolitan planning organization, the local transit provider and other affected agencies and jurisdictions to implement land use, transportation, and parking policies that promote transportation choice and to overcome identified deficiencies in the multimodal transportation network.

PART III: MODEL LAND DEVELOPMENT REGULATIONS

The following model regulations are intended to accompany the Florida Department of Transportation Multimodal Transportation District and Areawide Quality of Service Handbook (Multimodal Handbook). The model provides sample language and guidelines for amending local land development regulations to implement a multimodal transportation district that has been designated in the adopted local comprehensive plan. It is tied to the comprehensive plan language in the previous section of this report and is not intended to be a stand alone ordinance; nor does it address all issues that may arise within a particular context. Although the language is intended for use by local governments that have adopted an MMTD, much of the language may also be useful for promoting a multimodal transportation system within the broader community. Local governments should obtain professional planning and legal assistance when adapting this model regulatory language to fit local needs.

Article I. Multimodal Transportation Districts (MMTDs)

Section 1: General Requirements

1.1 Intent and Purpose

(1) The intent of this Article is to implement multimodal transportation districts (MMTDs) that have been designated within the *[local government]* pursuant to Chapter 163.3180(15), F.S. and the Florida Department of Transportation *Multimodal Handbook*, for the purpose of creating safe, comfortable and attractive environments for pedestrians and bicyclists, with convenient access to transit. Specific purposes of this Article include:

a) Establish land use, community design and transportation network guidelines and standards that facilitate walking, bicycling and transit use as an alternative to driving;

b) Establish incentives for developers to advance multimodal objectives within the MMTD.

1.2 Relationship to the Comprehensive Plan

Multimodal Transportation Districts shall be designated according to the minimum criteria set forth in the *[local government]* Comprehensive Plan and delineated on the Future Land Use Map pursuant to Chapter 163.3180(15), F.S. and the Florida Department of Transportation "Multimodal Transportation District and Areawide Quality of Service Handbook". This Article provides regulations to implement the following Goal, Objectives and Policies contained in the *[local government]* Comprehensive Plan: *[List multimodal Goal, Objectives and Policies]*.

1.3 Applicability

(1) The provisions of this Article apply to all development proposals within areas designated as Multimodal Transportation Districts in the Comprehensive Plan, or to developments that request and are granted such designation pursuant to Chapter 163.3180(15), F.S. the *[local government]* Comprehensive Plan.

(2) These regulations are intended to apply to all development including both public and private facilities within an MMTD.

(3) Inconsistencies between other sections of the land development regulations and those pertaining to the MMTD shall be superseded by the MMTD regulations.

Section 2: Land Use

2.1 Land Use Mix Required

(1) All development proposals shall contribute to accomplishing a mix of residential and non-residential uses as outlined in Table 5.

Table 5: Preferred Mix of Uses

LAND USE	EXISTING MIX	PREFERRED MIX*
Open Space/Parks/Recreational	XX%	5 -15%
Office/Commercial/Industrial	XX%	30 70%
Residential	XX%	20 60%

* Select a percentage that reflects a reasonable target for the specific MMTD.

Source: (*3*).

(2) Proposed developments should contribute to a mix of land uses that are compatible with the transit- and pedestrian-oriented nature of the MMTD and generally outlined in Table 6.

Table 6: Land Use Compatibility Matrix

	URBAN CENTER	REGIONAL CENTER	TOWN OR VILLAGE
Office			
Center Office	■	■	■
Suburban Office			■
Local Services	□	□	□
Medical Office	□	□	□
Commercial			
Hotels	□	□	□
Theaters	□	□	□
Restaurants	□	□	□
Local Shopping Centers	□	□	■
Regional Shopping Centers	■	■	--------
Convenience Retail	□	□	□
Specialty Shopping	□	□	■
Hospitals	■	■	■
Day Care	□	□	□
Recreational	■	■	■
Cultural	■	■	■
Schools and Colleges	■	■	■
Governmental/Institutional	■	■	■
Light Industrial/Manufacturing	□	□	□
Residential (mid high density)	■	■	■

Legend: ■ Primary Use, Highly Desirable □ Supporting Use, Contributing

Source: Adapted from (*3*).

(3) Proposed development should contribute to a mix of land uses that promote activity during peak and non-peak hours as outlined in Table 7.

Table 7: Land Uses Promoting Transit and Pedestrian Usage in Mixed-Use Areas

Land Use	Peak	Off-Peak
High Density Residential	■	■
Commercial/Office	■	
Destination Retail		■
Convenience Retail	■	■
Entertainment		■
Institutional	■	■
Day Care	■	
School	■	
Grocery Stores	■	■
Restaurants	■	■

Source: (*3*).

(4) Proposed development shall enhance the appropriate density and intensity of land uses within walking distance (1/4 mile) of transit stops. Recommended residential densities are outlined in Table 8.

Table 8: Recommended Residential Densities

RESIDENTIAL DENSITY	URBAN CENTER	REGIONAL CENTER	TOWN OR VILLAGE
0-7 Units per Acre	------	□	□
8-15 Units per Acre	□	■	■
16-24 Units per Acre	■	■	■
24+ Units per Acre	■	■	■

Legend: ■ Primary Use, Highly Desirable □ Supporting Use, Contributing

Source: (*3*).

(5) Proposed commercial uses should have a floor area ratio in the range of 0.5 to 1, however not less than 0.25.

Commentary: The floor area ratios cited above are recommended in Accessing Transit: Design Guidelines for Florida Bus Passenger Facilities, Florida Planning and Development Lab, Department of Urban and Regional Planning, Florida State University, March 2004.

(6) Proposed development within commercial and mixed-use zones of an MMTD shall provide retail and service uses at the street level to promote a pedestrian-oriented environment.

Retail shops on the street level with residential use above.

(7) All proposed multi-level parking structures shall allow at least 50% of the ground-floor street frontage, excluding driveway entrances and elevators, to accommodate pedestrian-oriented uses such as retail or neighborhood services.

Parking Garage: Auto-Oriented Façade

Parking Garage: Pedestrian-Friendly Façade

Source: (*9*).

(8) Auto-oriented uses such as auto sales and repair, commercial parking lots, and drive-though businesses are prohibited within the MMTD.

Commentary: If a local government desires to grant some limited use of drive-through windows, the following regulation may be considered:

(9) Drive-through service windows shall be limited to the rear of mid-block buildings and locations accessed via alleys provided they do not substantially disrupt pedestrian activity or surrounding uses. In addition, drive-through service windows shall be accessible by bicyclists.

Section 3: Street Network and Connectivity

3.1 General Requirements

(1) The street network shall be designed to promote the overall connectivity of the system while avoiding excessive through-traffic in residential areas by including:

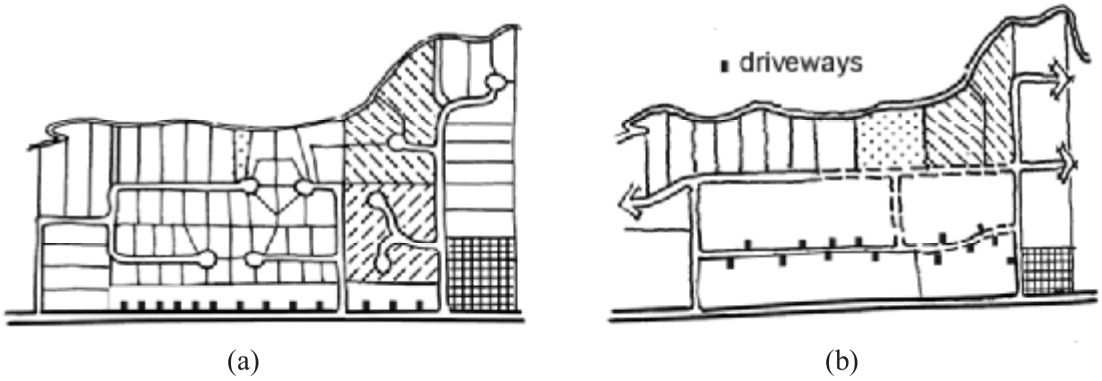
a) Multiple direct multi-modal connections to and between local destinations such as parks, schools, and shopping;

b) Inter-connections to multimodal transportation facilities and services within and outside the boundaries of the MMTD, including bus services, regional rail service, regional greenway and trail systems, the FIHS, and the regional aviation facilities;

c) Modified grid systems, T-intersections, roadway jogs, and other appropriate traffic calming measures as provided in *[Section 4. Traffic Calming]* to discourage the use of local streets for cut-through traffic; and

d) Additions or enhancements to improve the street network connectivity index as provided in *[Policy 8 of the Model Comprehensive Plan Amendments]*.

(2) All development plans shall contribute to developing and/or enhancing a street system that will allow access to and from the proposed development, as well as access to all existing and future development within a ¼ mile radius of the proposed development, via at least three arterial or major collector streets upon development of remaining parcels within the ¼ mile radius.



(a) Poor connectivity impedes walking, bicycling and transit use.
(b) Improved connectivity shortens local trips and improves multimodal mobility.

Figure 4: Connectivity of supporting streets (*10*).

3.2 Street Network Design

(1) All development plans shall incorporate and continue all sub-arterial streets stubbed to the boundary of the development plan by previously approved development plans or existing development. Developers required to extend collector roads may be eligible for impact fee credits where such extension is not reasonably related to the impacts of the development. The requirements of this subsection do not apply if it is demonstrated that a connection cannot be made because of the existence of one or more of the following conditions:

a) Physical conditions preclude development of the connecting street;

b) Buildings or other existing development on adjacent lands, including previously subdivided but vacant lots or parcels, physically preclude a connection now or in the future, considering the potential for redevelopment.

(2) The street network within development plans shall provide for future public street connections to adjacent developable or redevelopable parcels, and shall include block lengths not in excess of 660 feet, except where additional spacing is required in conformance with FDOT or *[local government]* access management standards and unless the developer demonstrates that a block length must be greater due to the existence of one or more of the following conditions:

a) Physical conditions (e.g. topography), buildings or other existing development on adjacent lands physically preclude a block length 660 feet or less; or

b) An existing public street terminating at the boundary of the development site, has a block length exceeding 660 feet, or is situated such that the extension of the street(s) into the development site would create a block length exceeding 660 feet. In such cases, every effort shall be made to accomplish reasonable block lengths to maintain walkability.

(3) Proposed office and commercial development plans for sites abutting an arterial or major collector street must include internal vehicle connections from the subject development site to each adjacent site, where applicable. Exceptions may be provided where abutting uses are clearly incompatible or where physical conditions or existing development on adjacent sites precludes such connection now or in the future considering the potential for redevelopment. Development plans shall include joint use driveways with adjacent sites wherever feasible.

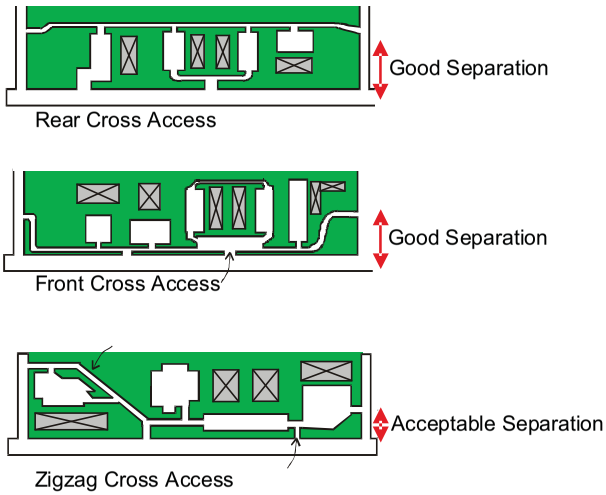


Figure 5: Cross-Access Corridors (*10*).

Commentary: For further information on access management policies and regulations see CUTR/FDOT Model Land Development Regulations that Support Access Management for Florida Cities and Counties, and visit the national access management website at www.accessmanagement.gov.

(4) Development plans shall provide or enhance a continuous service drive or alley extending the entire length of each block where it contributes to the street network. Where alleys have been vacated, development plans shall establish new alleys. Alleys shall be developed according to the following criteria:

a) Maintain a right-of-way width of *[XX]* feet, and a pavement width of no more than *[XX] feet*;

b) Differentiate the alley from through streets and sidewalks through the use of paving materials;

c) Provide a low street wall between the alley and the parking area and a landscaped strip inside of the wall.

Commentary: Land Design Innovations, Inc. suggests that alleys contribute to making the primary storefronts and streetscape a more pleasant environment by removing the necessary service and delivery areas to the rear of the site.

(5) All cul-de-sacs shall be designed with a turnaround in accordance with *[local ordinance section]* and shall be no more than *[XX]* feet in length as measured from the centerline of the intersecting street to the radius point of the cul-de-sac.

Commentary: In order to maintain bicycle and pedestrian mobility within developments having one or more block lengths in excess of 660 feet or cul-de-sacs, bicycle/pedestrian easements should be provided as detailed in Sections 7 and 8 of these regulations.

Section 4: Traffic Calming

4.1 Local and Collector Streets

(1) Collector and local streets shall include one or more of the following traffic calming measures to improve conditions for cyclists and pedestrians by altering driver behavior to reduce vehicle speed and traffic volume:

a) Volume control measures such as half, partial or one-way closures, diagonal deviators, median barriers, or forced turn islands;

b) Vertical speed control measures such as speed tables and raised intersections;

c) Horizontal speed controls such as mini-traffic circles, roundabouts, lateral shifts, chicanes, and realigned intersections;

d) Cartway narrowing such as neckdowns, gateways, chokers, and center island narrowings; and

e) Other measures such as on-street parking and marked and designated bike lanes.

(2) New or reconstructed non-FIHS arterial and collector streets with more than three travel lanes shall include a landscaped median and appropriate design measures (e.g. neckdowns, pavement markings, etc.) to clearly delineate pedestrian crossing locations and improve conditions for crossing pedestrians.

A traffic-calming measure that improves the pedestrian environment by slowing traffic. Source: (*11*).

Section 5: Parking

Commentary: The treatment of parking is a key element of the MMTD. Parking supply should be minimized to discourage vehicle use while encouraging transit, bicycle, and pedestrian use. When transit is available in close proximity to a proposed development, the need for off-street parking may be significantly reduced. Furthermore, offering parking credits to future development may encourage transit ridership. A trend in current practice is to establish maximum parking requirements as a means of minimizing single-occupancy vehicle use. These parking requirements are intended to supplement other local parking requirements particularly regarding the number of parking spaces for specific land uses and landscaping.

5.1 General Requirements

(1) New developments shall provide no more than the minimum number of parking spaces required for the proposed land use by the underlying zoning district. The following shall also apply:

a) On-street parking spaces on the right-of-way between the two side lot lines of the site may be counted to satisfy the minimum off-street parking requirements.

b) Carpool/Vanpool Parking: New commercial and industrial developments with 20 or more employee parking spaces shall designate at least 5 percent of the employee parking spaces for carpool or vanpool parking. Employee carpool and vanpool parking shall be located closer to the building entrance or the employee entrance than other employee parking with the exception of handicap parking. The carpool/vanpool spaces shall be clearly marked "Reserved-Carpool/Vanpool Only."

5.2 Parking Credits

(1) New development may be eligible for parking credits in exchange for transit facility placement, bicycle facilities, and/or monetary contribution toward public parking in accordance with the following criteria:

a) The minimum parking requirement may be reduced by 10 percent if an adequate sheltered transit stop and related transit amenities are provided within the development.

b) The minimum parking requirement may be reduced by up to 50 percent when the applicant can demonstrate, in a parking-traffic study prepared by a traffic engineer, that both of the following conditions exist:

i) The use of alternative modes of transportation, including transit, bicycles, and walking, and/or special characteristics of the customer, client, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to standard Institute of Transportation Engineers vehicle trip generation rates and minimum *[local government]* parking requirements.

ii) A Transportation Demand Management (TDM) Program has been approved by the *[local government]* that contains strategies for reducing vehicle use

and parking demand generated by the development and establishes benchmarks by which the program's effectiveness will be measured bi-annually.

5.3 Shared Parking

(1) Where it can be demonstrated that the demand for parking of the combined uses of two (2) or more buildings can be satisfied with the shared and jointly accessible off-street parking available to those buildings, then a special exception to these parking requirements may be granted by the *[local government]* to satisfy the minimum parking requirements pursuant to the following conditions:

a) The joint use of required facilities at different times may be allowed provided all of the following exist:

i) The applicant shows there will be no substantial conflict in the principal operating hours of the buildings or uses for which the joint parking use is proposed.

ii) The parking facility will be within 1/4 mile of buildings or uses it will serve.

iii) The parties involved in the joint parking facility agree to the joint use arrangement in a legal document that has been approved by the *[local government]* attorney and recorded in the *[County of record]* with a copy filed with the *[local government permits office]* .

(2) The simultaneous joint use of required facilities may be allowed provided all of the following exist:

a) No more than two (2) uses under separate ownership or occupancy shall be involved.

b) The uses will occur on the same development site.

c) It can be reasonably anticipated that a number of customers or clients will be served.

Commentary: Shared parking can be used to significantly reduce the amount of parking areas in a multimodal district. Shared parking arrangements between uses is most appropriate in areas where: a specific parking problem exists; land values and parking facility costs are high; clustered development is desired; and traffic congestion or vehicle pollution is a significant problem and adding pavement is undesirable. The potential for shared parking is particularly high in mixed used districts.

5.4 Fee in lieu of parking

(1) An in-lieu parking fee may be submitted to the city for each required parking space that is not provided on site. The in-lieu parking fee shall be determined annually by the *[local government]* based on current land and construction costs. There is hereby created a special fund within the Office of the Treasurer-Controller into which in-lieu fees shall be deposited to be used only for the construction of public parking facilities.

5.5 Parking Lot Location and Size

(1) To minimize the impact of large expanses of parking on the pedestrian environment, parking spaces shall be located to the rear and sides of buildings wherever feasible. No off-street parking shall be located between the front façade of any building(s) and the primary adjacent street.

(2) Auto parking and maneuvering areas shall not be located between a primary building entrance and an abutting minor arterial or collector street, except where the applicant has demonstrated that no other alternative is available.

(3) Auto parking lots and maneuvering areas located to the side of a building cannot occupy more than 50% of a site's frontage onto a minor arterial or collector street.

(4) Wherever possible, auto parking lots and maneuvering areas on corner lots should not be located adjacent to intersections.

(5) Individual parking areas may be no larger than *[XX square feet in size]*. Separation between individual parking areas may be achieved by the placement of internal accessways.

(6) Bicycle parking facilities (bike racks) shall be provided in all vehicle parking lots as provided in *[Section 8.2]*.

Section 6: Transit Facilities

(1) The following types of developments located along a transit route may be required to construct transit stops at the discretion of the *[local government]* or in collaboration with [*local transit agency*]:

a) Residential developments having an average automobile peak hour trip rate of *[25 trips or greater]*.

b) Commercial and industrial developments other than office developments, having an average automobile peak hour trip rate of *[100 trips or greater]*. Office developments having an average peak hour trip rate of *[50 trips or greater]*.

c) Institutional uses and public facilities, including churches, hospitals, middle schools, high schools, universities and colleges, public parks (other than neighborhood parks), libraries, post offices, and other institutional and public facilities having an average automobile peak hour trip rate of *[100 trips or greater]*.

(2) Transit stop design shall be a clearly defined waiting area for transit riders, open to the public at large and equipped with amenities for bicyclists and pedestrians including adequate lighting, benches, weather protection, system information, maps, trash bins, bicycle parking, and a land pad accessible to a disabled person. Plans shall include lifetime maintenance plans for the facility.

This transit stop provides many amenities. Source: (*9*).

(3) New buildings at or near transit stops shall provide for convenient pedestrian access to the transit stop by providing walkways connecting the new building entrances to sidewalks accessing the transit stop.

Section 7: Sidewalks and Pedestrian Facilities

Commentary: Proposed pedestrian and bicycle facilities should be coordinated with the local government bicycle/pedestrian coordinator, any bicycle/pedestrian advisory committee, and adopted bicycle or pedestrian facilities plan.

7.1 General Requirements

(1) New development shall provide safe and convenient facilities for pedestrians that are reasonably free from hazards and high levels of automobile traffic, and provide a reasonable and direct route of travel between destinations. This section shall apply to any new development that creates a new building entrance(s). Alteration or changes in use that do not involve any creation of a new building entrance are not subject to the provisions of this section.

Commentary: This section applies to any new development that creates a new building entrance; however, the local government could apply this based on a development size instead.

(2) Pedestrian facilities shall be provided on any new or reconstructed streets in accordance with the *Florida Pedestrian Facilities Planning and Design Handbook* .

(3) Pedestrian facilities shall be designed with security considerations including street lighting, bushes no greater than two (2) feet in height, and tree branches no lower than six (6) feet in height. To provide clear visibility of pedestrians approaching intersection crosswalks at night, the approaches to and all street corners should be well-illuminated.

All intersection lighting should illuminate the crossing and waiting areas and/or create backlighting to make the pedestrian silhouette clearly visible on the approach.

(4) Pedestrian facilities shall include shade trees where possible.

7.2 Pedestrian Connections

(1) A sidewalk shall be provided between all new building entrances and all streets adjacent to the development site. The sidewalk shall provide a direct connection to existing public right-of-way and public sidewalks or transit stops.

(2) A sidewalk shall be provided between any new building entrance and all other new or existing building entrances on the same development site. Entrances used for loading and unloading freight are not subject to this standard. Internal pedestrian paths provided in conformance with this subsection shall provide weather protection features such as awnings or arcades within 30 feet of all customer entrances.

(3) A sidewalk shall be provided immediately adjacent to the exterior wall of a new building greater than 100 feet in length when the wall is located next to a street or parking lot. A pedestrian path shall also be provided along the entire length of the wall when the public entrance is located in that area. Exceptions to this standard include:

a) If the edge of the building is within 20 feet of a public sidewalk and the building entrance is connected to the public sidewalk by an on-site pedestrian facility.

b) If the edge of the building is bordered by a perimeter of landscaping that does not exceed 30 feet in width and an on-site pedestrian facility is constructed at the edge of the landscaped area.

(4) A 20-foot wide bicycle/pedestrian easement shall be provided to connect cul-de-sacs, or to pass through blocks in excess of 660 feet.

(5) Where needed for purposes of traffic safety or access to nearby schools, playgrounds, public parks, trails, shopping facilities, or other community facilities, new developments may be required to dedicate a public right of way for bicycles and pedestrians, not less than 20 feet in width.

Commentary: Nearby" means uses within 1/4 mile that can reasonably be expected to be used by pedestrians and bicyclists. A local government can also go further and require improvements to existing unimproved public accessways on properties adjacent to the development, provided the local government makes findings to demonstrate consistency with constitutional requirements. Said improvements to unimproved public accessways shall connect to the closest public street or developed accessway.

(6) Pedestrian access points at property edges and to adjacent lots shall be coordinated with existing development to provide pedestrian circulation between developments.

(7) All on-site pedestrian walkways located in vehicle use areas shall be distinguished from driving surfaces through the use of durable, low maintenance smooth surface materials to enhance pedestrian safety and comfort, as well as the attractiveness of the walkways.

(8) All non-residential buildings set back *[fill in number]* feet or more from the public right-of-way shall provide for direct pedestrian access from the building to buildings on adjacent lots.

Commentary: This code language was adapted from Wilmapco Mobility Friendly Design Standards November 1997, Wilmington Area Planning Council where they recommended 100 feet as the standard.

(9) Within multi-family residential development with three (3) or more units, on-site pedestrian facilities shall be constructed in the following locations:

a) From every unit to all other units within the residential development.

b) From every unit to all laundry, recreation and other community facilities in the residential development

c) From every building located within 40 feet of a public or private street to the street right-of-way line.

7.3 Accessible Pedestrian Facilities

(1) Americans with Disabilities Act (ADA). To aid in the independent mobility of people who cannot drive, special accommodations should be provided in accordance with the *ADA Accessibility Guidelines for Buildings and Facilities* (http://www.access-board.gov/adaag/html/adaag.htm).

Commentary: Types of improvements to aid in mobility as outlined in Walkable Communities: Twelve Steps for an Effective Program, include:

- *Two (2) curb ramps should be constructed on each street corner.*
- *One (1) curb ramps should be constructed at each side of marked mid-block crossings. Or, as an alternative treatment, the crosswalk area should be raised to curb height.*
- *When pedestrian demand signals are used independent call poles should be appropriately placed at the top of each ramp on all signalized intersections.*
- *All corners should have adequate sight triangle and sufficient depth for controller box, signal pole and other hardware to be located out of the walk zone. Audio/tactile pedestrian systems should be used in areas with large elder and disabled populations.*
- *Minimum walk speed, sidewalk cross slopes, grades, drainage inlets and minimum widths should be considered in constructing new and retrofitting existing walkways.*

Section 8: Bicycle Facilities

Commentary: Designation criteria for an MMTD assumes that some bicycle facilities, particularly bicycle lanes, already exist within the District boundaries, however, the model regulations below include some basic requirements that may already be found in the land development regulations. In addition, proposed bicycle facilities should be coordinated with the local government bicycle coordinator, any bicycle advisory committee and the Bicycle Facilities Plan.

8.1 Bicycle Lanes

(1) Bicycle lanes shall be provided on new or reconstructed arterials and major collector roadways within the MMTD in accordance with the FDOT *Bicycle Facilities Planning and Design Guidelines* (Revised April 2002).

(2) Restriping of arterial or major collector roadways under [local government] jurisdiction within the MMTD shall be considered any time the facility is scheduled for resurfacing allowing for a safe, dedicated space for bicycle travel.

A striped bicycle lane provides a safe travel lane for bicyclists. Source: (*12*).

Commentary: According to Dwight Kingsbury, FDOT, Pedestrian and bicycle facilities must be given full consideration on all proposed projects including Resurfacing, Restoration and Rehabilitation (RRR), safety, and traffic operation projects. Their inclusion on intersection reconstruction projects is particularly important as these may be excepted out of later roadway projects. Where an existing route for bicyclists is present it shall be maintained...project records must support and document why facilities were not included, if they indeed were not. If right-of-way is constrained, the local government may consider reducing motor vehicle travel lane width to 11' resulting in a traffic calming effect. Another consideration may be to provide separate bicycle paths or even bicycle boulevards on parallel streets.

8.2 Bicycle Boulevards

Commentary: The FDOT Bicycle Facilities Planning and Design Guidelines Handbook defines a bicycle boulevard as a system of roadways and connections between neighborhoods or areas in a community that forms a bicycling throughway, but discourages through and higher speed motor vehicle movement. Bicycle boulevards are bicycle priority streets where people can feel safe bicycling, even if they do not feel comfortable bicycling in traffic on ordinary streets. They are intended to have low traffic volumes, slow traffic speeds, and clear signage indicating that priority is given to bicycle traffic.

(1) Installation of a Bicycle Boulevard may be required within residential developments that meet the following conditions:

a) Existing low vehicle volumes;

b) Very little commercial frontage;

c) Roadway is parallel to a major arterial or a high-traffic collector street (within approximately 0.25 mile);

d) Not a transit or truck route;

e) Roadway is reasonably continuous, i.e. it extends over at least *[two miles]*; it should have few jogs with main segments at least 0.5 mile long.

(2) The *[local government]* may require the following treatments on a residential or local street that has been designated as a bicycle boulevard to provide a safe and convenient circulation system for bicycles:

a) Traffic control devices so that bicyclists on bike routes can easily cross major streets and arterials;

b) STOP signs are positioned so that the bicycle boulevard has the right of way in appropriate locations;

c) Traffic calming measures, such as traffic circles or semi-diverters, in selected locations to ensure that motor vehicles do not divert to the bicycle boulevard;

d) Forced right-turns along bicycle boulevards or other locations to discourage non-local motor vehicle traffic from using the roadway in question. A sign shall be placed at intersections indicating that cars must turn right, but bicyclists may proceed straight.

8.3 Bicycle Parking

(1) Bicycle racks shall be located in convenient, visible, well-lit areas, with easy access, near main entrances. The racks should not interfere with pedestrian traffic and should be protected from potential damage by motor vehicles. They may be located within the public right-of-way with *[local government]* approval. The following requirements shall also apply:

a) All vehicle parking facilities containing less than ten parking spaces shall provide one bicycle rack with no less than four (4) spaces (two high-quality inverted "U" racks).

b) For vehicle parking facilities containing more than ten parking spaces the applicant shall provide one bicycle rack with no less than four spaces plus two bicycle parking spaces for each additional ten parking spaces in the lot. No more than 20 bicycle parking spaces shall be required in any one parking facility.

c) One vehicle parking space may be eliminated for each four spaces of bicycle parking provided.

The standard inverted U type bike rack supports the bike frame at two locations and allows users to secure their bikes with either a cable or U type lock. Source: (*13*).

(2) The *[local government]* and other affected agencies shall provide bicycle parking facilities at public uses such as schools, city hall, transit stations, park-and-ride lots, recreation facilities and libraries in accordance with the above standards.

Section 9: Amenities and Design

9.1 Pedestrian Amenities and Community Spaces

(1) All development plans shall contribute to the establishment or enhancement of community and public spaces by providing a space where at least two of the following: patio-seating area, pedestrian plaza with benches, covered playground area, kiosk area, water feature, clock tower or other similar focal feature or amenity. Any such area shall have direct access to the public sidewalk network and be placed in a visible location that is convenient for use as a public gathering area. The review authority may find compliance with this standard if the proposed pedestrian amenities and community spaces are incorporated as part of the shopping street. Examples include wider sidewalks, special paving, ornamental lighting, planters, public benches and seating walls, and public art.

9.2 Building Orientation

(1) All buildings on the site must be oriented to either a public street, a private drive, or a shopping street. The building orientation standard is met when the building is placed within the maximum setback established for the zone. The maximum setback may be exceeded if the area between the building and the street or private drive is landscaped or is an enhanced pedestrian space.

(2) Private drives used to meet building orientation standards must incorporate street design elements. When private drives are used, the setback is measured from the back of the sidewalk.

(3) On all buildings that meet the building orientation standard, building entries must be in compliance with this code.

Commentary: In Portland, Oregon s publication, Planning and Design for Transit Handbook: Guidelines for Implementing Transit Supportive Development, non-residential buildings can be placed no more than 15-feet from the sidewalk and residential projects may have distinguishable front yards for privacy while engaging the street with windows and porches.

9.3 Exterior Wall Articulation, Facades, and Ground Floor Windows

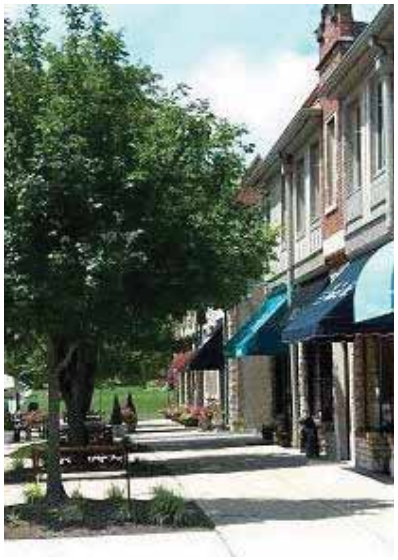
(1) Exterior building walls shall not continue along an uninterrupted plane for more than 100 feet. An uninterrupted plane is a wall that has no variation in exterior surface along its length. Except for building walls facing an alley, ground floor facades 100 feet or greater in length, measured horizontally, shall incorporate wall plane projections or recesses having a depth of at least three (3) percent of the length of the facade and extending at least 20 percent of the length of the facade.

(2) Ground floor facades that face streets adjacent to the development site shall have arcades, colonnades, display windows, entry areas, awnings, or other such features along no less than 50 percent of their horizontal length.

(3) Except for building walls facing an alley, ground floor walls shall contain windows (as stated below) at the ground level. The windows may extend a maximum sill height of four (4) feet above finished grade to any head height. The portion of window area meeting this standard is from the sill (bottom edge) to the head (top edge) including portions up to nine (9) feet above the finished grade. Alcoves, entryways, and extruding portions of the wall shall be treated by measuring through such areas as though along the flat wall of a building. Solid walls are prohibited along street frontages. This standard does not apply to parking structures.

(4) General Standard. The windows in any walls that require windows shall occupy at least 50 percent of the length and 25 percent of the ground floor wall area. Required window areas shall be either windows that allow views into working areas or lobbies, pedestrian entrances, or display windows. The bottom of the windows shall be no more than 4 feet above the finished grade.

(5) Corner Lots. On corner lots, the general ground floor window standard stated in subsection (c) must be met on one street frontage only. On the other street(s), the requirement is ½ of the general standard. The applicant may choose on which street to apply the general standard.



Interesting facades contribute to this pedestrian-friendly area. Source: (*14*).

Section 10: Application for Development in MMTDs

(1) Any property owner who proposes to develop or redevelop land in an MMTD shall contact the reviewing jurisdiction to schedule a pre-application conference during which the applicant will be advised on applicable procedures and requirements.

(2) The development application shall include the following information and supporting documentation in the development or plat application:

a) A legal description of the relevant parcel of land, including a separate description of the portion that lies within the MMTD, if applicable;

b) A statement of how the applicant proposes to subdivide or develop the affected property, including a plat or a site plan map at a scale sufficient to show the building location, access connections, street network and bicycle/pedestrian circulation, open space, parking, amenities and any other matter as may be required by the *[local government]* land development code;

c) A statement of how the proposed development is planned and designed to be consistent with the objectives and policies of the MMTD;

d) Requests, if any, for a variance from the provisions of *[this Article]*.

(3) Upon receiving the development or plat application, staff shall review the proposal and produce a written report for consideration by the *[local government Development Review Committee]* containing staff recommendations regarding the application including all supporting findings and conclusions regarding the consistency of the proposed project with the MMTD objectives and policies and proposed conditions of approval. The report may recommend one or more of the following:

a) Approval of the development as proposed, with or without conditions;

b) Denial of the development as proposed;

c) Modification of the proposed development and the issuance of a development permit for the development as modified, with or without conditions.

(4) Upon consideration of the staff report, the *[local government development review committee]* shall issue a final determination. Appeals to the determination of the *[local government development review committee]* shall be addressed in accordance with *[local government code]*.

Commentary: Local governments should strive to make a streamlined development approval process to garner the cooperation of the development community.

Section 11: Incentives

(1) Expedited Development Review. Development applications within the MMTD shall be entitled to an Expedited Development Review Process. The Expedited Development Review Process entitles an applicant to be placed on a priority list, established by the *[local government official]*. Expedited review is on a first-come, first-served basis of priority applications. The applicant must submit a technically complete application in order to be placed on the priority list for expedited development review.

(2) Traffic Impact Fees. A reduction in the traffic impact fee for developments within the MMTD may be granted pursuant to this section with the implementation and maintenance of the corresponding action in Table 9.

Table 9. Traffic Impact Fee (TIF) Reduction

ACTION	TIF REDUCTION
Development within the MMTD*	2%
Construction of on-site but off road internal pedestrian/bicycle network	2%
Construction of direct walkway connections to the nearest arterial for non-abutting developments	3%
Direct pedestrian/bicycle connection to destination activity (such as a commercial/retail facility, park, or school) if residential development, or to origin activity (such as a residential area) if commercial/retail facility	3%
Installation of on-site sheltered transit stop (with current or planned service or bus stop within ¼ mile of site with adequate walkways if approved by *local government transit agency*)	3%
Installation of one secure bike parking space per 10 vehicular parking stalls	1%
Connection to existing or future regional shared use path (either 1% directly, or by existing, safe access)	1%
Development of a trip reduction plan to be implemented by property management	1%
Designation of ten (10) percent of all non-residential parking as carpool/vanpool parking facilities if located in a manner maximizing accessibility subject to ADA requirements**	1%

** Automatic reduction for developing within MMTD and compliance with the provisions of this Ordinance.*

*** Requires regular maintenance.*

Source: (*15*).

Commentary: These incentives were primarily derived from APA s PAS Report #468, Creating Transit-Supportive Land Use Regulations including specific ordinance language from Vancouver, Washington and Clark County, Washington. Percentages provided in Table 5 are for example only and should be modified to reflect the relative priority of issues in the MMTD.

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Case Study – Bethesda, MD

[illegible]
Parking Revenue as a Source of Funding for TDM

Background

[illegible]

The Revenues and Expenses

[illegible]

Implementation Issues

Cash Keys

Conclusion

Figure 1

The North Bethesda Transportation Management District – An Overview

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Transit Improvements

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Infrastructure Investments

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Service Investments

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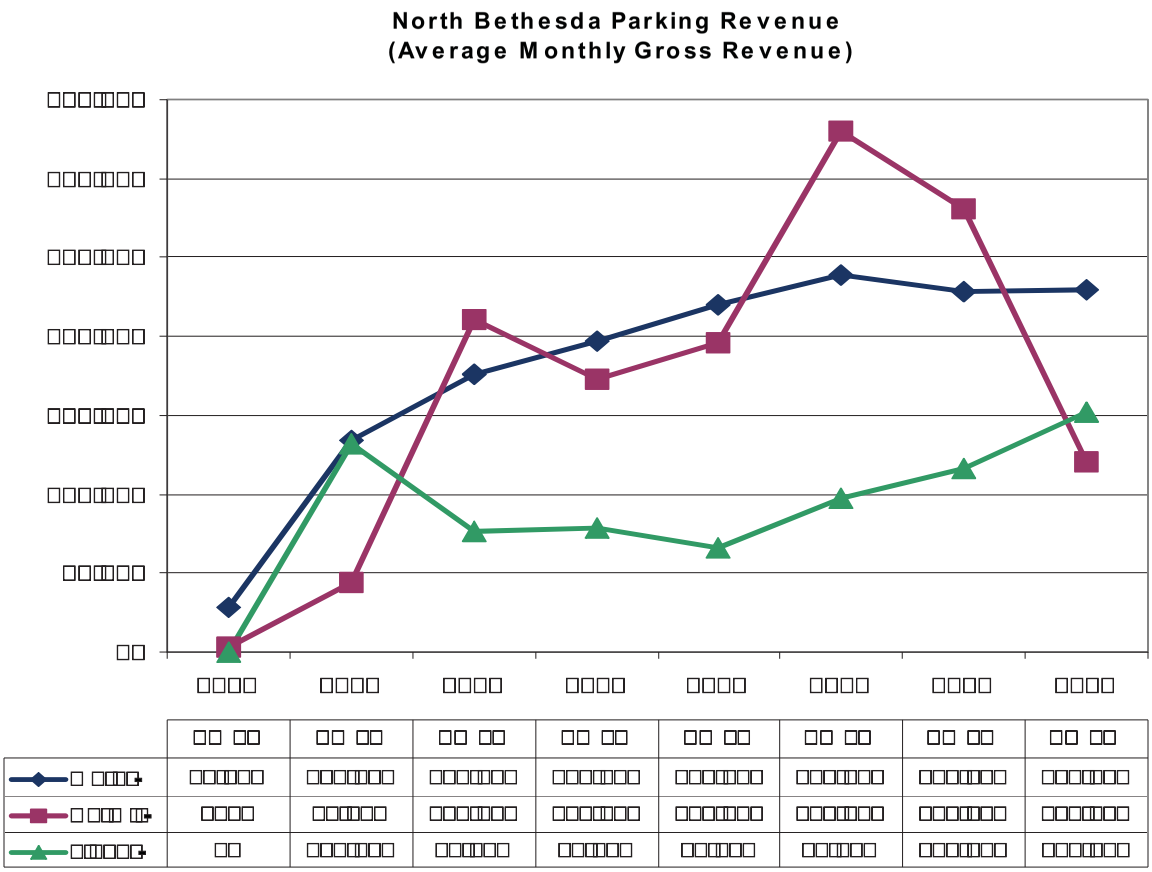
North Bethesda Parking Revenue
(Average Monthly Gross Revenue)

Figure 2

Case Study – Mountlake Terrace

Parking

Parking facilities are required to accommodate the vehicular and truck traffic within the City. Although most areas of Mountlake Terrace have adequate parking facilities, a few commercial areas will need special attention. In examining parking standards and programs, the City must balance the need to accommodate a certain number of vehicles with concerns regarding congestion, traffic flow, circulation, aesthetics, and impacts to the environment. The management of both on-street and off-street parking is an important issue for the City.

On-site parking standards are established in the City's zoning code. Too little on-site parking can result in inappropriate on-street parking. On the other hand, large amounts of on-site parking (e.g., large parking lots) can disrupt the land use pattern and make pedestrian circulation difficult and uncomfortable (especially as it increases distances between land uses). Large parking lots may result in an unattractive community image (especially if landscaping is not provided), and impact the environment and water quality. This latter impact is associated with storm water run-off from impervious surfaces. To some extent, provision of large amounts of on-site parking also attracts more vehicles. Conversely, increased use of public transit and TDM programs reduces the need for vehicular parking.

On-street parking standards are addressed in the City's vehicle and traffic code. Both businesses and residential development rely on parking along the edge of streets, in addition to on-site parking. If properly located, on-street parking can supplement other kinds of parking. However, it should be allowed only where conditions are safe and where the impact on traffic flow is accepted or desired. Inappropriate on-street parking may impede traffic flow, contribute to accidents, or cause congestion in some areas. On-street parking typically requires management, for example, by enforcing parking restrictions. The development and implementation of on-street parking is subject to state standards. Periodically, Mountlake Terrace's regulations will need to be updated to reflect the current state standards.

Funding Capability Analysis

In compliance with the requirement for a multiyear financing strategy for transportation improvements, the City annually develops a six-year Transportation Improvement Program (TIP), which lists transportation improvement priorities, cost estimates, and funding sources for the prioritized list of transportation projects. The adopted 2003-2008 TIP is included in this chapter as Table TR-3.

In addition, the State of Washington's Growth Management Act requires that a jurisdiction's transportation element include a funding capability analysis to judge needs against probable funding resources. Past or possible funding sources for transportation improvement projects include both state and federal sources, some of which are identified in Table TR-12 below.

Table TR-12

Past or Possible Funding Sources For Transportation Projects in Mountlake Terrace

Federal Sources, including:

- Community Development Block Grant Funds (through HUD)
- Congestion Mitigation Air Quality
- TEA – 21
- National Highway Systems
- STP-Statewide Competitive Program
- STP-Transportation Enhancement
- STP-Safety including Hazard and RR
- STP-Urban regionally selected
- FAUS

State Sources, including:

- Transportation Partnerships Program
- Arterial Improvement Program
- Pedestrian Safety and Mobility Program
- Public Works Trust Fund
- WSDOT Funding
- Interagency Committee for Outdoor Recreation
- Snohomish County Parks mitigation

Local Sources, including:

- Gas tax (restricted portion)
- Real Estate Excise Tax (REET)
- Gambling tax
- SEPA mitigation contributions

Not all listed sources in Table TR-12 are currently available. For example, the Congestion Mitigation Air Quality fund is exhausted for 2003. Also, projects funded traditionally funded through the Transportation Improvement Board will subject to new application rules, as the Board's role is phased out. On the other hand, the Public Works Trust Fund, which is a source of low-interest loans, continues to be available because it is based on dedicated revenues and loan re-payments. The City of Mountlake Terrace has used many of the listed resources, including Community Development Block Grants, in previous years. Funds for all the listed sources, when available, are subject to varying state and federal budget levels and to competition from other local governments.

Potential tax revenue sources for transportation include the Motor Vehicle Fuel Tax, Real Estate Excise Tax, and local gambling taxes. In past years, a portion of the Motor Vehicle Excise Tax was used to fund local transportation projects. However, passage of Initiative 776, with subsequent action by Snohomish County, has eliminated this source of funding for transportation improvements by the City.

In 1990, the state legislature authorized local jurisdictions to impose specific impact fees on developments to ensure that adequate facilities and demand strategies are available. Impact fees are intended to help local jurisdictions offset the cost of facilities needed to provide for growth and development. The City of Mountlake Terrace currently does not impose impact fees under this statute. However, the City uses its authority under the State Environmental Policy Act (SEPA) to charge fees for certain kinds of development with transportation impacts. The disadvantage of relying on SEPA is that smaller projects are exempt (even though they have a cumulative effect on traffic) and any development fees are levied on a case-by-case basis after the project is proposed. While

an up-front traffic impact fee system is somewhat complicated to establish and administer, it can help provide predictable funding to mitigate the transportation impacts of development.

The City also has authority to develop a Street Pavement Intrusion Plan, (i.e., a plan to identify cost reimbursements for degradation of existing and new street pavements by utility cuts) and Local Agency Cooperative Agreements (to identify, evaluate, and pursue interlocal agreements to jointly fund transportation improvement needs). Before committing the significant time and effort needed to tap into each of these sources, the City may want to set priorities, based on cost-effectiveness.

Other local funding tools, such as transportation improvement districts and community redevelopment financing, are also a possibility. They are not subject to taxing limits or state budget decisions. However, these tools rely on private sector cooperation and significant local government effort.

In order to proactively deal with changing fund sources for local priorities, the City may need to pursue funding opportunities more aggressively. This could be done in a variety of ways, including as part of updating the budget or developing a future comprehensive Street Improvement Program.